V. ENVIRONMENTAL IMPACT ANALYSIS
I. NOISE

This section is based on the Noise Assessment Technical Report prepared by PCR Services Corporation regarding the proposed project, which is provided in Appendix P of this EIR.

1. ENVIRONMENTAL SETTING

a. Noise and Vibration Basics

(1) Noise

Sound is mechanical energy transmitted by pressure waves in a compressible medium, such as air. Noise is generally defined as unwanted or excessive sound. Increasingly recognized as an environmental pollutant with the potential to cause physiological or psychological damage, noise can interfere with communication, work, rest, recreation and sleep.

Sound can vary substantially within the human range of hearing. Therefore, noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). To better approximate the range of sensitivity of the human ear to various frequencies, the A-weighted decibel scale (dBA) was developed. This scale de-emphasizes low frequencies to which human hearing is less sensitive and focuses on mid-range frequencies. A doubling of sound energy results in a 3 dBA increase in noise levels. However, the human ear does not typically notice changes in a community noise level of less than 3 dBA.[235] Some individuals who are extremely sensitive to changes in noise may notice changes from 3 to 5 dBA. A 5 dBA increase is readily noticeable, while the human ear perceives a 10 dBA increase in sound level to be a doubling of sound. A change in noise levels will usually not be detectable unless the new noise source is at least as loud as the ambient conditions.

[235] *Federal Highway Administration,* Highway Noise Fundamentals, September 1980.

Although the A-weighted scale accounts for the range of people's response, and therefore, is commonly used to quantify individual event or general community sound levels, the degree of annoyance or other response effects also depends on several other perceptibility factors. These factors include:

- Ambient (background) sound level;
- Magnitude of sound event with respect to the background noise level;
- Duration of the sound event;
- Number of event occurrences and their repetitiveness; and
- Time of day that the event occurs.

Sound levels decrease (or attenuate) exponentially as the distance from the noise source increases. For a single "point" source, such as a piece of mechanical equipment, the sound level normally attenuates by about 6 dBA for each doubling of the distance. In comparison, sound generated by "linear" sources, such as vehicles traveling along a busy street, attenuates by about 3 dBA for each doubling of the distance. This attenuation rate is based upon "hard" reflective surfaces (e.g., pavement and concrete) and increases to 4.5 dBA for each doubling of the distance for "soft" surfaces (e.g., vegetative cover).

Objects that obstruct the line-of-sight between a noise source and a receptor attenuate the source strength if the receptor is located within the "shadow" of the obstruction, such as behind a sound wall. This type of sound attenuation is known as "barrier insertion loss." If a receptor is located behind the wall but still has a view of the source (i.e., line-of-sight not fully penetrated), some barrier insertion loss will still occur, however to a much lesser extent. Additionally, a receptor located on the same side of the wall as a noise source may actually experience an increase in the perceived noise level as the wall reflects noise back to the receptor, thereby compounding the noise.

Various noise indices have been developed to express the way in which noise levels are experienced by sensitive receptors. The most commonly used index is the equivalent sound level (L_{eq}), which is the average sound exposure over a specified period of time. Examples of other noise metrics based on given periods of time include L_{max} (the maximum noise level), L_{min} (the minimum noise level), and L_{xx} (the noise level exceeded XX percent of the time).

Noise metrics can be categorized as single event metrics and cumulative metrics. Single event metrics describe the noise from individual events, such as an individual

aircraft flyover. Cumulative metrics describe the noise in terms of total noise exposure throughout an extended period of time, such as a full day.

A Single Event Noise Exposure Level (SENEL) is a single event metric reported for aircraft takeoffs and landings. This metric is essentially equivalent to the Sound Exposure Level (SEL) metric and accounts for the maximum noise level of the event and the duration of the event. The relationship between SENEL and the L_{max} is not constant, however. For most aircraft noise events, SENEL is about 5 to 10 dB higher than L_{max}. The SENEL value is the integration of all the acoustic energy contained within the event. Previous studies have addressed the effects of SENEL on speech and sleep. The Federal Interagency Committee on Aviation Noise (FICAN) in 1997 recommended use of a particular dose-response curve that can be used to estimate "the maximum percent of the exposed population expected to be behaviorally awakened" from the SENEL. This is referred to as the FICAN 1997 curve. This curve has been used to estimate population percentage awakenings for various interior SENEL levels. As an example, an interior noise level of 65 SENEL corresponds to a five percent probability of awakening.[236]

Several methods have been devised to relate noise exposure over time to community response. A commonly used noise metric for this type of study is the Community Noise Equivalent Level (CNEL). The CNEL, originally developed for use in the California Airport Noise Regulation, adds a 5 dBA penalty to noise occurring during evening hours from 7:00 P.M. to 10:00 P.M., and a 10 dBA penalty to sounds occurring between the hours of 10:00 P.M. to 7:00 A.M. to account for the increased sensitivity to noise events that occur during the quiet late evening and nighttime periods. Thus, the CNEL noise metric provides a 24-hour average of A-weighted noise levels at a particular location, with an evening and a nighttime adjustment, which reflects increased sensitivity to noise during these times of the day.

(2) Ground-borne Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the

[236] *FICAN, Annual Report Federal Interagency Committee on Aviation Noise, 1997.*

source of the vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source.

Both construction and operation of development projects can generate ground-borne vibration. In general, demolition of structures preceding construction generates the highest vibrations. Construction equipment such as vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible vibration during construction activities. Heavy trucks can also generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions.

b. Regulatory Framework

Many government agencies have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise and ground-borne vibration. The Cities of Long Beach and Lakewood have adopted a number of policies, which are in part, based on federal and state regulations that are directed at controlling or mitigating environmental noise effects. City policies that are relevant for project development and operation are discussed below. A discussion of relevant Federal and State policies, as well as a more detailed discussion of City policies, is provided in the Noise Assessment Technical Report, Section 3.0 (Regulatory Framework and Significance Criteria), which is included as Appendix P to this EIR.

(1) Noise

(a) City of Long Beach

Chapter 8.80 of the Long Beach Municipal Code (LBMC) controls unnecessary, excessive and annoying noise and vibration in the City of Long Beach. However, this chapter does not control noise sources that are preempted by other jurisdictions including in-flight aircraft and motor vehicles operating on public rights-of-way.

As outlined in Section 8.80.150 of the LBMC and presented in Table 28 on page 498, the City of Long Beach has established maximum exterior noise levels based on land use districts. Noise levels in excess of the levels indicated in Table 28 are conditionally permitted, depending on the intensity of the noise and the duration of exposure.[237] As the

[237] *Noise levels may not exceed the exterior noise standard for a cumulative period of more than thirty minutes in any hour; or plus five decibels for a combined period of more than fifteen minutes in any hour; or plus ten decibels for a combined period of more than five minutes in any hour; or plus fifteen decibels for a combined period of more than one minute in any hour; or plus twenty decibels for any period of time (maximum noise level).*

Table 28

EXTERIOR NOISE LIMITS

Land Use District	Land Uses within District	Maximum Noise Levels (dBA) L_{eq}		
		Daytime [a]	Nighttime [b]	Anytime
One	Predominately residential	50	45	—
Two	Predominately commercial	60	55	—
Three	Predominately industrial	—	—	65 [c]
Four	Predominately industrial	—	—	70 [c]
Five	Airports, freeways, and waterways	Regulated by other agencies and laws		

[a] *7:00 A.M. to 10 P.M.*

[b] *10:00 P.M. to 7 A.M.*

[c] *Districts Three and Four limits are intended primarily for use at their boundaries rather than for noise control within those districts.*

Source: LBMC, Section 8.80.150.

project site is located in Land Use District 4, the Noise District Map in Section 8.80 of the LBMC will need to be updated to reflect land uses designated as part of the project. Please see Section V.H., Land Use and Planning, for a detailed discussion of the proposed updates to the LBMC and Noise Element that will be required as part of the project. As outlined in Section 8.80.170 of the LBMC and presented in Table 29 on page 499, the City of Long Beach has also established maximum interior noise levels based on land use districts.[238] If the existing interior or exterior ambient noise level exceeds that permissible within the noise limit categories, the allowable noise exposure standard is increased to ambient conditions (Section 8.80.150 and 8.80.170 of the LBMC). In addition, these exterior and interior noise limits are adjusted depending on the duration of exposure (e.g., the standard plus ten decibels for a cumulative period of more than five minutes in any hour). Section 8.80.240 of the LBMC (vehicle, motorboat or aircraft repair and testing) provides an exemption to the exterior and interior noise limits (Section 8.80.150 and 8.80.170 of the LBMC) for aircraft within the airport property or within any other aviation-related property abutting it.

For projects requiring a building or other related permit, construction noise within the City of Long Beach is regulated by Section 8.80.202 of the LBMC. During the week (including weekday Federal holidays), construction activities are generally limited to between the hours of 7 A.M. and 7 P.M. On the weekend, construction activities are limited

[238] *Noise levels may not exceed the interior noise standard for a cumulative period of more than five minutes in any hour; or plus five decibels for a combined period of more than one minute in any hour; or plus ten decibels for any period of time (maximum noise level).*

Table 29

INTERIOR NOISE LIMITS

Land Use District	Land Uses within District	Maximum Noise Levels (dBA) L_{eq}		
		Daytime [a]	Nighttime [b]	Anytime
All	Residential	45	35	—
All	School	45	—	—
All	Hospital, designated quiet zone	—	—	40

[a] *7:00 A.M. to 10 P.M.*
[b] *10:00 P.M. to 7 A.M.*

Source: LBMC, Section 8.80.170.

to between the hours of 9 A.M. and 6 P.M. on Saturdays and are prohibited on Sundays, unless a Sunday Work Permit is authorized. Section 8.80 of the LBMC requires a Noise Variance for all construction activity that falls outside the approved construction hours. The LBMC does not provide specific standards for noise levels associated with construction activities. Although there is no upper threshold for construction noise, the LBMC Section 8.80 does give the Noise Control Officer authority to address extremely loud or unusual noises (e.g., employee use of radios or other noises not associated with the construction activity).[239]

The City began efforts to control airport-related noise through adoption of an ordinance more than 20 years ago. These efforts were groundbreaking and precedent setting—and they were continuously challenged in the courts. It took more than a dozen years to strike a balance between air commerce and community noise exposure. The resulting Airport Noise Compatibility Ordinance (LBMC Chapter 16.43), passed in 1995, gives Long Beach one of the strictest noise-controlled airports in the United States. LBMC Chapter 16.43 controls the maximum SENEL (Single Event Noise Exposure Limits) limits, prohibited activities, cumulative noise limits (CNEL, or Community Noise Equivalent Level) and noise budgets, compliance with noise budgets, violation enforcement, general exemptions, and flight limits. In addition, the Noise Ordinance regulates certain ground-related activities (e.g., touch-and-go practice and engine run-ups that occur on Airport property).[240] LBMC Chapter 16.43 does not regulate in-flight aircraft or establish

[239] *"Noise Control Officer" means the city official appointed by the city manager to direct the noise control office.*

[240] *To determine compliance with LBMC Chapter 16.43, aircraft approach and departure SENEL noise levels are monitored by a comprehensive noise monitoring system which is made up of 18 noise monitors located throughout the City of Long Beach and within the City of Lakewood. The monitors are concentrated northwest and southeast of the Runway 12/30 as air carrier aircraft use this runway and are the predominant noise source at the Airport.*

acceptable land use noise levels related to SENEL from the Airport. CNEL budget and enforcement limits have been established for five separate user groups (i.e., air carrier, charter, commuter, general aviation, and industrial users) based on the baseline year of 1989-90.[241] CNEL noise contours for the purpose of compliance with LBMC Chapter 16.43 noise budget and enforcement limits are provided in Figure 50 on page 501. As illustrated, the noise contours generally extend from northwest to southeast due to the larger aircraft associated with Runway 12/30. A more detailed discussion of LBMC Chapter 16.43, including SENEL limits at specific monitoring stations, is provided in the Noise Assessment Technical Report, Section 3.0 (Regulatory Framework and Significance Criteria), which is included as Appendix P to this EIR.

The Noise Element of the City of Long Beach General Plan includes several general goals that reflect the City's desire to attain a healthier and quieter environment for all of its citizens while maintaining a reasonable level of economic progress and development. These goals regard improvement and preservation of the unique and fine qualities of Long Beach, development of a well balanced community, improvement of the urban environment, development of noise policy guidelines and development of specific neighborhood noise plans. Refer to the Noise Technical Report for a more specific discussion of these and other goals within the Noise Element.

The Noise Element suggests the following acceptable construction noise levels, where an average maximum noise level outside the nearest building at the window of an occupied room closest to the site boundary, should not exceed:

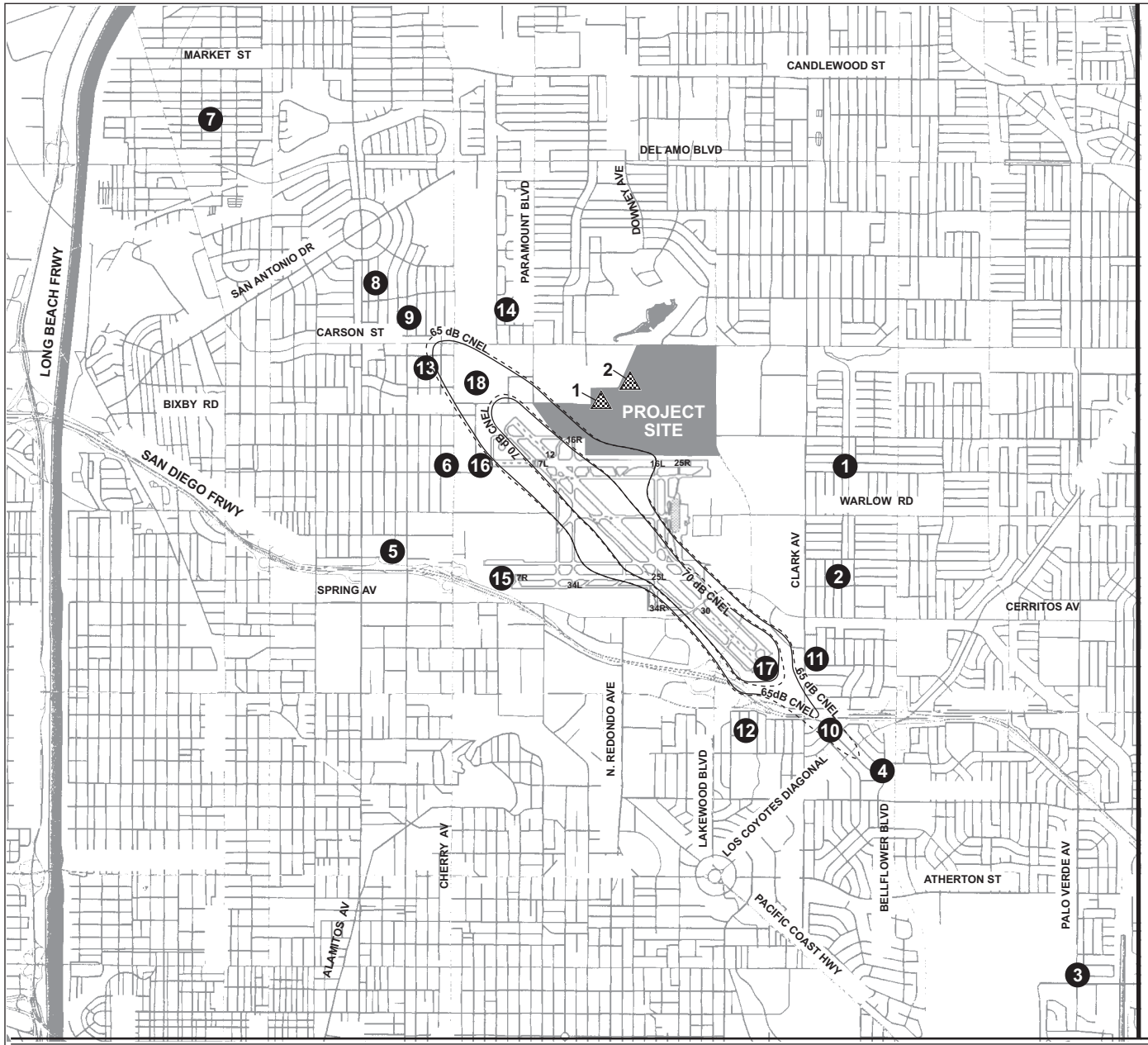
- 70 dBA in areas away from main roads and sources of industrial noise; and
- 75 dBA in areas near main roads and heavy industries.

The Noise Element of the City of Long Beach General Plan also recommends criteria for maximum acceptable outdoor and indoor noise levels based on land use type. The criteria are presented in the Noise Assessment Technical Report. The criteria are for planning purposes only and do not carry any regulatory authority.

(b) City of Lakewood

Noise in residential areas is addressed in Section 9376 of the Lakewood Municipal Code (LMC). In the City of Lakewood no person within any area zoned for residential use or any area adjacent thereto may operate air conditioners, mechanical equipment or

[241] *Baseline noise budgets were established by the actual monitored noise levels of each group during the cumulative 12-month period from November 1, 1989 to October 31, 1990.*



LEGEND

1) Monlaco St. / Charlemagne Av.
2) Pageantry St. / Charlemagne Av.
3) Palo Verde Av. / Anaheim St.
4) Los Altos Park
5) Corner of the Boundary Lines City of Signal Hill / Long Beach North of 405 Fwy
6) North Alley of 36th Street between Gardena Av. / Cherry Av.
7) Elm Av. / Home St.
8) Tehachapi Dr. / Gundry Av.
9) Cartagena St. between Gaviota & Rose Av.
10) Stearnlee Av. between Burnett & Eagle St.
11) Greenbrier Rd. / 28th St.
12) Quincy Av. / Burnett St
13) Ally west of Gardena Av. & South of Marshall Pl.
14) Pixie Av. / Greenmeadow Rd. - City of Lakewood
15) Runway 7R Approach End.
16) Runway 7L Approach End.
17) Runway 30 Approach End.
18) Runway 12 Approach End.

Budget Limits

Enforcement Limits with 41 Air Carrier Flights per Day

Airport Noise Monitoring Location

On-Site Monitoring Locations

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Source: City of Long Beach Airport Bureau, 2001

Figure 50
65 dB and 70 dB CNEL Contours-Noise Ordinance Budget Limits and Enforcement Limits with 41 Air Carrier Flight Per Day

machinery, which causes the noise level at the residential property line to exceed 65 dB L_{eq}. Section 9347 of the LMC limits commercial noise levels to 60 dBA L_{eq}, as measured at the property line of residentially zoned or occupied property. Similarly, Section 9368 of the LMC limits heavy manufacturing noise to 60 dBA L_{eq}, as measured at the property line of residentially zoned property, or otherwise 70 dBA L_{eq}. No other applicable operational noise standards were identified in the LMC.

Section 8020 of the LMC regulates construction noise within the City of Lakewood. Construction activities are generally limited to between the hours of 7 A.M. and 7 P.M. Monday through Saturday, and 9 A.M. and 7 P.M. on Sundays within 500 feet of a residential zone. However, specific construction noise level standards are not provided within the LMC.

(c) Los Angeles County

State law requires the creation of Airport Land Use Commissions (ALUCs) to coordinate planning efforts for those areas surrounding public use airports. Under the Los Angeles County Department of Regional Planning, the Regional Planning Commission is responsible for acting as the ALUC for airports in Los Angeles County, including the Long Beach Municipal Airport. The Los Angeles County Comprehensive Airport Land Use Plan (ALUP) provides policies related to noise levels and sources associated with airport operations. These policies include:

- N-1: Use the CNEL method for measuring noise impacts near airports in determining suitability for various land use types.
- N-2: Require sound insulation to insure a maximum interior 45 CNEL in new residential, educational, and health-related uses in areas subject to exterior noise levels of 65 CNEL or greater.
- N-3: Utilize the Table Listing Land Use Compatibility for Airport Noise Environments in evaluating projects within the planning boundaries.
- N-4: Encourage local agencies to adopt procedures to ensure that prospective property owners in aircraft noise exposure areas above a current or anticipated 60 CNEL are informed of these noise levels associated with high noise exposure.

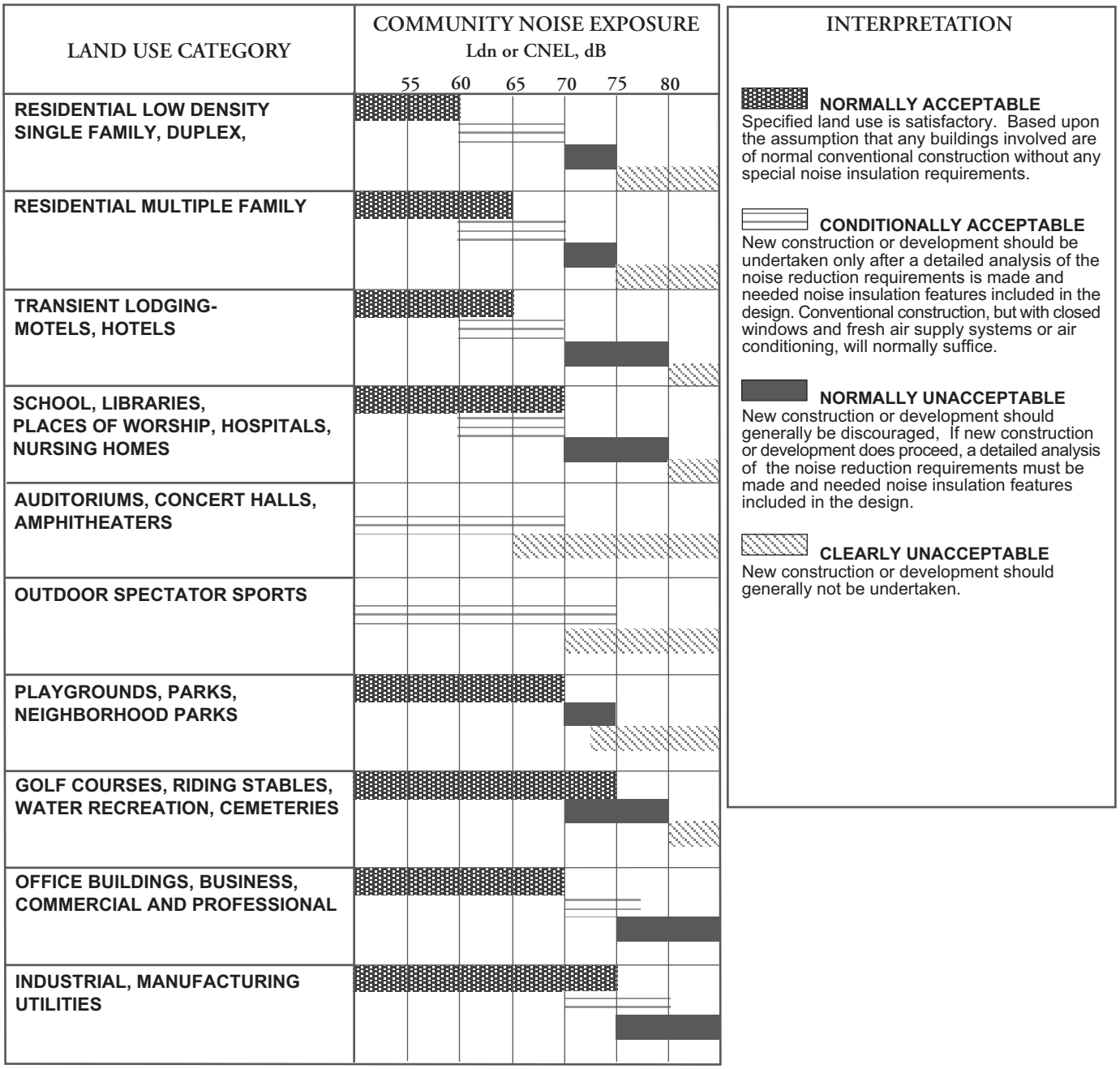
(d) California Department of Transportation, Division of Aeronautics

In 1990 California legislation (AB 4164) directed the California Department of Transportation (Caltrans), Division of Aeronautics, to develop and implement a program to assist in the training and development of airport land use commissions. Caltrans published the Airport Land Use Planning Handbook (Handbook) in 1993, with a revised version published in 2002, to satisfy these requirements. As discussed in Section V.E., Hazards, the Handbook provides recommendations and suggestions for consideration by individual airport land use commissions, counties and cities in developing an airport land use plan. With regard to noise, the Handbook provides discussion on the nature of airport noise, the effects of noise on people, established regulations and policies, noise exposure measurement issues, and determination of acceptable noise levels. The Handbook suggests land use compatibility criteria, stating that residential uses in urban areas should not be located within the 65 CNEL contour.

Title 21 of the California Code of Regulations, Division 2.5 (Caltrans, Division of Aeronautics), requires a minimum standard of exterior sound transmission control for residential buildings that are located within the 65 CNEL contour such that internal noise levels due to external noise sources should not exceed 45 dB (CNEL) for habitable rooms.

(e) California Department of Health Services

The California Department of Health Services establishes noise criteria for various land uses. Figure 51 on page 504 identifies the typically acceptable limits of noise exposure for various land use categories. Figure 51 shows that the noise exposure for a residential land use is “normally acceptable” when the CNEL at exterior residential locations is equal to or below 60 dBA, “conditionally acceptable” when the CNEL is between 60 to 70 dBA, “normally unacceptable” when the CNEL is between 70 to 75 dBA, and “clearly unacceptable” when the CNEL is greater than 75 dBA. For office and industrial land uses a CNEL of 75 dBA is considered “normally acceptable,” while a CNEL level of greater than 75 dBA is considered “normally unacceptable.” In general, CNEL increases of less than 3 dBA are not considered an adverse change in the environment, while an increase of between 3 and 5 dBA is generally considered to be an adverse impact. An increase in CNEL of 5 dBA or more is generally considered a significant impact. These guidelines apply to noise sources such as vehicular traffic.



Source: Guidelines for the Preparation and Content of the Noise Element of the General Plan, California Department of Health Services, in coordination with the office of Planning and Research.

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Figure 51
Land Use Compatibility for Community Noise

(2) Ground-Borne Vibration

(a) City of Long Beach

The City of Long Beach does not have any adopted policies or standards for construction ground-borne vibration.[242] Policies and standards related to operational ground-borne vibration are provided in Section 8.80.200 of the LBMC, where the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property, or at 150 feet from the source if on a public space or public right-of-way, is a code violation. The Ordinance defines the vibration perception threshold as the minimal ground- or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. The perception threshold is presumed to be 0.001 g's in the frequency range 0-30 hertz and 0.003 g's in the frequency range between 30-100 hertz which is equivalent to a peak velocity in terms of RMS of 0.01 inches per second over the range of 1 to 100 hertz.

(b) City of Lakewood

There are no adopted City of Lakewood policies or standards for ground-borne vibration.

c. Existing Local Noise Conditions

The project site and nearby vicinity are primarily exposed to noise generated by traffic on the surrounding roadways and freeways, noise generated by operations at the Airport including aircraft takeoffs and landings, noise generated by engine testing at Boeing's engine run-up area and noise generated by the separate and ongoing remediation efforts pursuant to the LARWQCB Cleanup and Abatement Order 95-048. Each of these noise sources is discussed in the following sections.

(1) Noise Sensitive Receptors

Some land uses are considered more sensitive to intrusive noise than others, due to the types of activities typically involved at the receptor location. Specifically, residences,

[242] *However, the Federal Transit Authority provides a construction equipment vibration damage threshold criterion of 0.20 inches per second PPV for fragile buildings (U.S.DOT, 1995).*

schools, libraries, religious institutions, hospitals and nursing homes are generally more sensitive to noise than are commercial and industrial land uses. The nearest sensitive residential receptors that may be affected by the proposed project are the single-family residences located along and north of Carson Street. Other potentially sensitive uses in the more distant area include multi-family and single-family residences, schools, libraries, religious institutions, hospitals and nursing homes.

(2) Ambient Noise Levels

(i) Long Beach Airport

The proposed PacifiCenter project is located immediately north of the 1,166-acre Airport which is designated as a non-hub airport (i.e., serving less than 0.05 percent of the total nation-wide enplanements) with 350,603 annual operations (landings and takeoffs) in 2002. The airport serves a large number of private non-commercial aircraft and is one of the nation's busiest airports in terms of general aviation activity, in which 93 percent of the annual operations are general aviation.[243, 244] The remaining seven percent of the operations are as follows: five percent of the operations is by air carrier, two percent is by commuter carrier, and less than one percent is by industrial.[245, 246] In 2002, the airport handled approximately 58,600 tons of air cargo. In addition, between August 2001 and 2003, the number of passengers increased from 600,000 annual passengers to almost 3,000,000 annual passengers. The Airport includes scheduled flights by America West, American, Airborne Express, Federal Express, Horizon, Jet Blue Airways, and United Parcel Service.[247]

[243] *Long Beach Airport, LGB Monthly Airport Activity Report, December 2002.*

[244] *General aviation is defined as activity other than operation by air carrier, commuter carrier, industrial operations, charter operations, and public aircraft (i.e., private non-commercial aircraft).*

[245] *Long Beach Airport, LGB Monthly Airport Activity Report, December 2002.*

[246] *Air carrier is defined as a scheduled carrier operating aircraft having a certified maximum takeoff weight of 75,000 pounds or more, transporting passengers or cargo. Commuter carrier is defined as a scheduled carrier operating aircraft having a certified maximum takeoff weight of less than 75,000 pounds, transporting passengers or cargo. Industrial operation refers to aircraft over 75,000 pounds for purposes of production, testing, remanufacturing, or delivery by or under the control of a manufacturer based at the Long Beach Airport.*

[247] *Long Beach Airport, LGB Monthly Airport Activity Report, August 2003.*

The Airport has five runways, ranging in total length from 4,267 feet to 10,000 feet.[248] There are two sets of parallel runways aligned in an east-west (7L/25R and 7R/25L) and north-south (16L/34R and 16R/34L) direction forming a rectangle, and an additional 10,000-foot-long runway (Number 12/30) that is aligned in a northwest-southeast direction splitting the two sets of runways. All of the runways are used for general aviation. Runway 12/30 is used for commercial flights as well as general aviation. Runway 7L/25R is used as the back-up runway for commercial flights, but is typically used only during rare circumstances (e.g., during repaving of Runway 12/30). Airport runways are identified in Figure 50 on page 501 as they relate to the project site and runway utilization characteristics are provided in Table 30 on page 508.

The City of Long Beach Airport Bureau monitors aircraft noise levels at several locations around the Airport. Noise from daily operations, including takeoffs and landings, are calculated in terms of CNEL, from which noise contours are developed. This data is updated on a quarterly basis in compliance with Title 21 of the California Code of Regulations. The most recent Long Beach Airport Noise Report demonstrates compliance with the LBMC Chapter 16.43 noise budget, in which the noise contours were within the noise budget contours provided in Figure 50 on page 501.[249] As illustrated, the noise contours generally extend from northwest to southeast due to the larger aircraft associated with runway 12/30. The 70-CNEL contour is generally contained within the Airport boundaries. However, the 65-CNEL contour extends to approximately the intersection of Carson Street and Cherry Street. As shown in Figure 50, the southwestern portion of the project site is within the 65-CNEL contour.

The Airport's noise monitoring system is made up of 18 noise monitors located throughout the City of Long Beach and one within the City of Lakewood. The monitors are concentrated northwest and southeast of the Runway 12/30 as air carrier aircraft use this runway and are the predominant noise source at the Airport. Monitoring Station No. 14 is the most representative station for the Lakewood portion of the project site and is located near Pixie Avenue and Greenmeadow Road within the City of Lakewood (see Figure 50 on page 501). Monitoring data from Station No. 14 for the last consecutive 12-month period ending in the first quarter of 2003 is provided in Table 31 on page 509. As shown in this table, SENEL noise levels average approximately 83 dB for arrival and 91 dB for departures.

[248] *Measured end to end of pavement. There is a short piece of pavement at the south and north ends of Runway 16/34 that is not counted as pavement or as a stopway probably because of an east-west taxiway at the end.*

[249] *Acoustical Analysis Associates, Incorporated, Analysis of Long Beach Airport Noise Monitoring Data for the First Quarter of 2003, May 19, 2003.*

Table 30

LONG BEACH MUNICIPAL AIRPORT RUNWAY CHARACTERISTICS

Orientation	Runway Number	Aircraft Runway Usage (%)	Length (feet)	Width (feet)	Use
East-West	7R/25L	7R (2.5%) 25L (25.0%)	5,420	150	General Aviation
East-West	7L/25R	7L (2.5%) 25R (25.0%)	6,192	150	General Aviation and airline alternate for Runway 12/30
North-South	16R/34L	16R (7.0%) 34L (0.5%)	4,470	75	General Aviation
North-South	16L/34R	16L (7.0%) 34R (0.5%)	4,267	75	General Aviation
Northwest-Southeast	12/30	12 (6.0%) 30 (24.0%)	10,000	200	General Aviation and Commercial

Source: www.airnav.com/airport/KLGB, 2003 and US Department of Transportation, FAA, personal correspondence, November 24, 2003.

Air carrier operations during the first quarter of 2003 were predominately A-320s and to a lesser extent MD-80s, where A-320s and MD-80s were approximately 69 and 15 percent of the 33.8 average daily flights, respectively. SENEL noise contours illustrated in Figure 52 on page 510 show a hypothetical typical sound exposure level for a single MD-80 and A-320 commercial jet aircraft departure on Runway 30.[250] While the MD-80 and A-320 commercial jet departures are the most common air carrier departure operations, other aircraft will generally produce less noise, while some may on occasion be louder. The SENEL exposure for a typical MD-80 departure ranges from 100 to 75 SENEL from west to east across the proposed project site. The SENEL exposure is reduced substantially for the more predominate A-320 departure and is approximately 90 SENEL along the western boundary of the project site and quickly dissipates below 75 SENEL for most of the project site.

Continuous noise monitoring was conducted at two representative locations on the project site from January 16 through January 19, 2004, to further characterize airport related noise levels north of the Airport (see Figure 53 on page 511). Monitoring data from two positions indicates that the SENEL ranges from 80.2 dBA to 81.8 dBA and the CNEL ranges from 58 dBA to 59 dBA. This measurement data is consistent with measurement

[250] *City of Long Beach, Airport Bureau, Written Communication, May 2001 and Jet Blue Long Beach Airport Analysis, May 29, 2001.*

Table 31

NOISE MONITORING DATA FOR LONG BEACH AIRPORT STATION NO. 14[A]

		Arrival				Departure			
		SENEL		L_{max}		SENEL		L_{max}	
Quarter	CNEL	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.
Q4 2001	58.8	84.8	93.0	76.1	82.8	90.7	103.2	81.6	95.7
Q1 2002	59.3	82.9	90.9	72.8	80.8	90.7	106.8	81.6	97.6
Q2 2002	60.6	83.0	92.8	74.4	84.7	91.8	116.9	83.1	109.8
Q3 2002	60.5	80.5	87.8	71.6	79.0	91.1	102.3	82.2	93.9

[a] *The monitoring station is located near Pixie Avenue and Greenmeadow Road within the City of Lakewood*

Source: Dennis Rambeau, Noise/Operations Supervisor of Long Beach Airport, March 5, 2003.

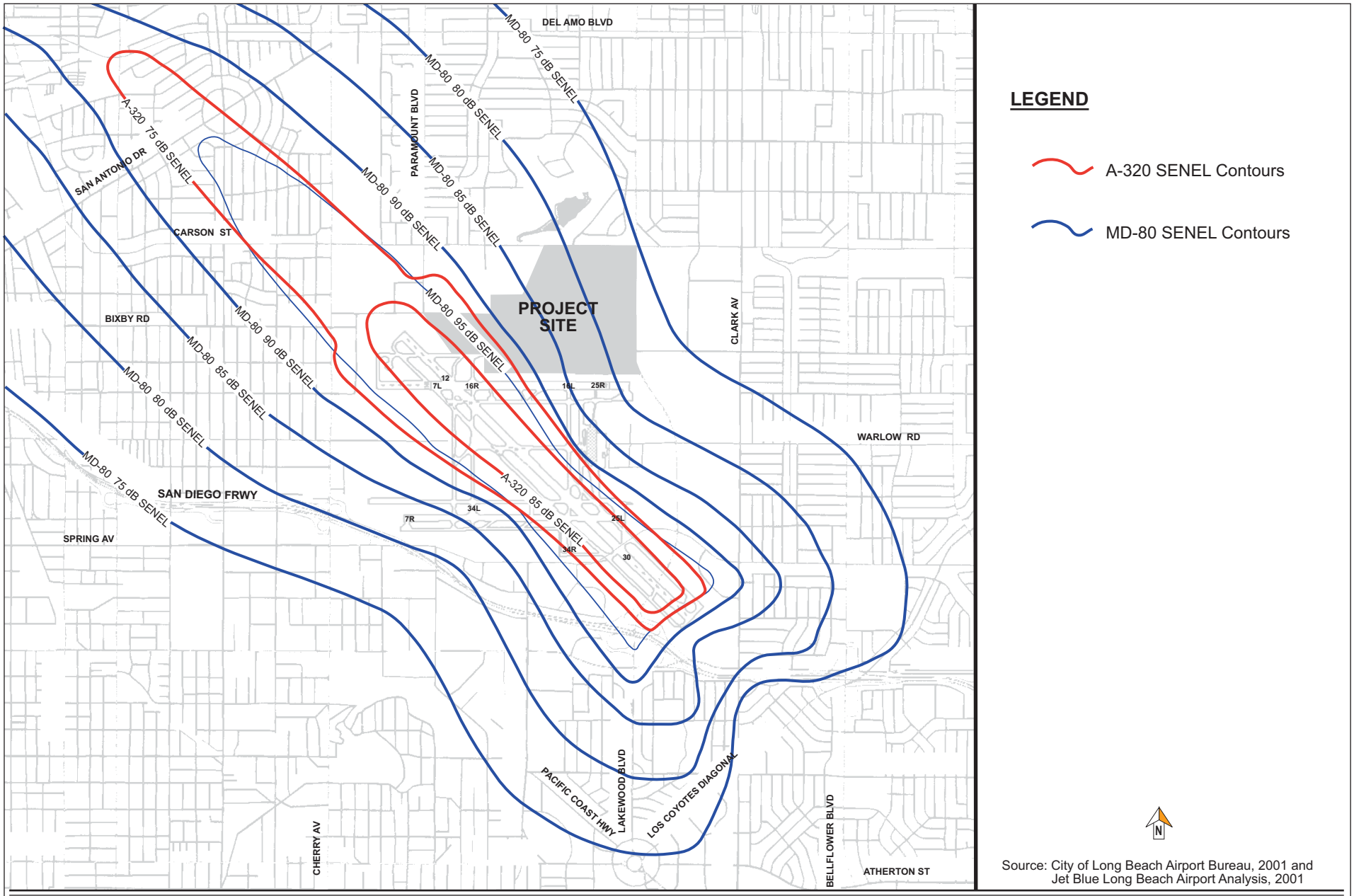
data from Long Beach Airport Station No. 14 and the CNEL and SENEL contours presented in Figure 50 and Figure 52, respectively.

Scientific research has found that the minimum continuous sound level that will permit relaxed conversation within 100 percent intelligibility throughout a typical residential living room (talker/listener separation greater than approximately 3.5 feet) is 45 dB (L_{eq} = 45 dB). A 95 percent intelligibility conversation (considered to be "satisfactory conversation") can be obtained with a steady sound level of up to 64 dB.[251] As shown in Figure 50, the majority of residential units in the project vicinity comply with California Title 21 (i.e., interior and exterior noise levels of 45 and 65 dB CNEL, respectively). Therefore, longer-duration noise levels (i.e., CNEL and L_{eq}) are not expected to be problematic from a speech interference level as the majority of residential units in the project vicinity comply with California Title 21 and aircraft related interior noise levels are typically less than 45 dBA L_{eq} at residential units. However, noise events produced by aircraft overflights in the project vicinity could exceed an internal 65 SENEL and may intermittently be problematic from a speech interference level. In addition, during outdoor activities aircraft overflights may briefly interfere with speech communication.

Airport related noise complaints concentrate along the arrival and departure flight track for Runway 12/30 and to a much lesser extent north of Carson Street.[252] Based on

[251] *Source: Caltrans, California Airport Land Use Planning Handbook, January 2002.*

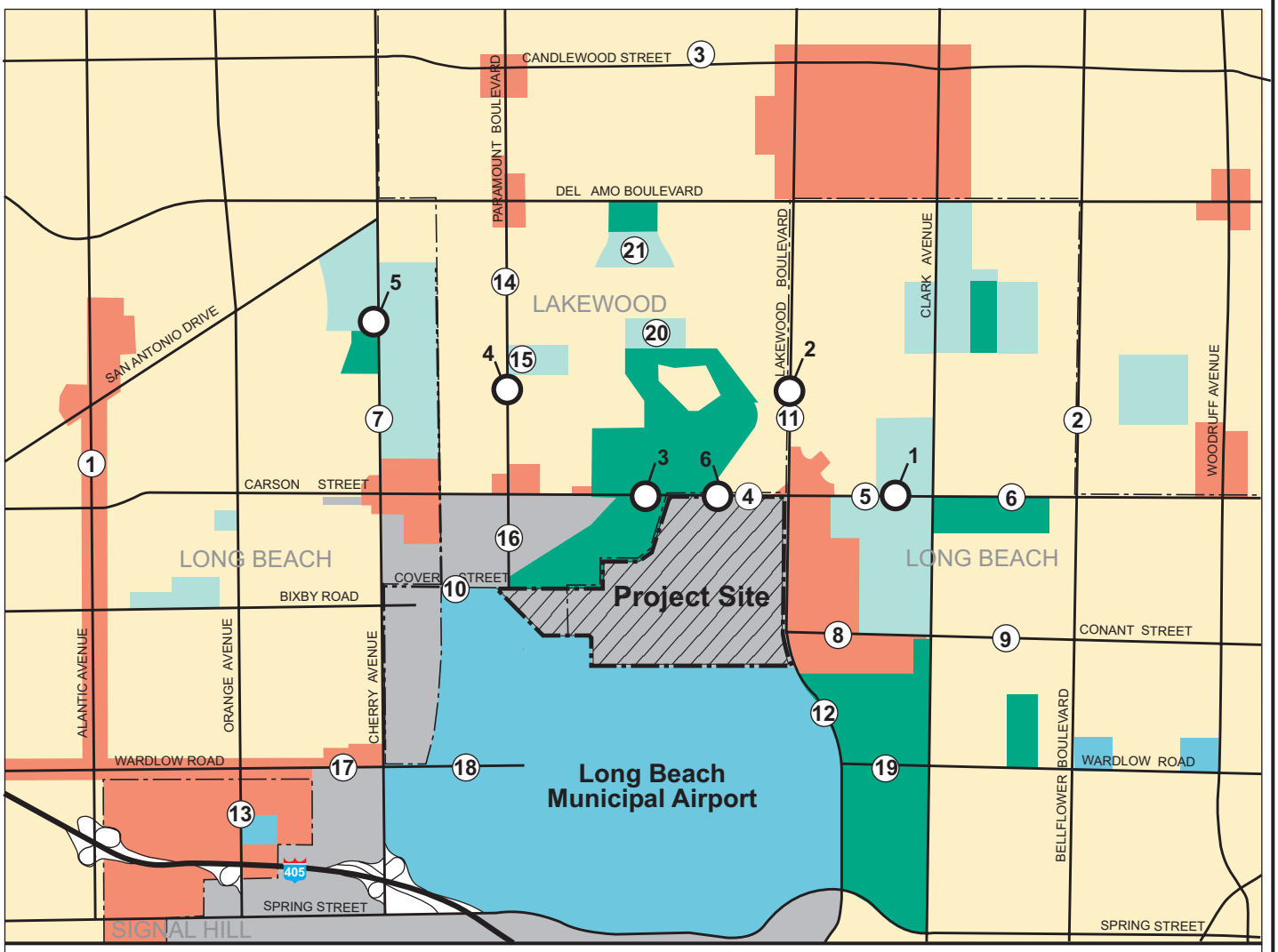
[252] *Long Beach Airport, http://www.lgb.org/content/Noise%20Activity.htm*



Source: City of Long Beach Airport Bureau, 2001 and Jet Blue Long Beach Airport Analysis, 2001

PCR

Figure 52
SENEL Contours for A-320 and MD-80
(Typical Hypothetical Departure from Runway 12/30)



LEGEND

- Measurement Locations
- (#) Analysis Locations
- Residential
- Commercial
- Park/Golf Course
- Industrial
- Institutions & Schools

NOTABLE OFF-SITE RECEPTORS

(5) Long Beach City College

(6) Heartwell Park

(12)(19) Skylinks Golf Course

(13) John Burroughs Elementary School

(15) James Madison Elementary School

(20) Herbert Hoover Middle School

(21) Riley Elementary School

Note: The land uses identified on this map are intended to provide a general representation of the uses surrounding the measurement and analysis locations. As such, not all uses are depicted.

PCR

0 0.5 Miles

Source: PCR Services Corporation, 2004

Figure 53
Off-Site Noise Measurement and Analysis Locations

general aviation flight track data provided by the City of Long Beach Airport Bureau, the predominant east/west (7L/25R and 7R/25L) runway flight pattern results in over flights north of Carson Street. The north/south (16L/34R and 16R/34L) runway flight pattern is used infrequently and therefore results in few complaints.[253] These overflights may be a source of annoyance to existing sensitive receptors in the project vicinity as the general community attitude toward a CNEL of 60 dB results in approximately 7 percent of the population to be highly annoyed.[254]

The Airport has approximately 60,000 annual helicopter operations per year, in which the predominant east/west configuration is used most of the time and inbound and outbound routes occur between 7L/25R and 7R/25L generally in line with Wardlow Road. The north/south configuration is used less frequently and inbound and outbound routes occur between 16R/34L and 16L/34R generally in line with Downey Avenue and Redondo Avenue. The north/south configuration is the only path that crosses the project site. Helicopter corridor utilization characteristics and operational data are provided in Table 32 on page 513. These helicopter operations are included in the noise measurement data provided above in Table 32. Noise measurements conducted for overflight helicopter operations on the project site resulted in a maximum noise level of 72 dBA during departure and 75 dBA during an approach for a R-22 helicopter. Emergency services helicopters also operate out of the Airport. The Los Angeles Sheriff's Department typically has two to six operations per night which travel north across the project site following Downey Avenue. In addition, the Long Beach Police Department has eight to ten operations per night and typically takes the most direct path to the emergency, which could occur across the project site. These events are infrequent and are unscheduled.

(ii) Boeing Engine Run-Up Area

Engine run-up tests for newly manufactured 717 and C-17 aircraft are currently conducted within a 48-acre area known as the Boeing Enclave, located within the western portion of the project site and depicted in Figure 6 of the Noise Assessment Technical Report, which is included in Appendix P to this EIR. Refer to Section III, Project Description, for a more detailed discussion of operations within the Boeing Enclave.

[253] *Long Beach Airport, http://www.lgb.org/content/Noise%20Activity.htm*

[254] *Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992.*

Table 32

LONG BEACH MUNICIPAL AIRPORT HELICOPTER CHARACTERISTICS

Approach and Departure Corridor	Corridor Usage (%)	Annual Operations (%)	Daily Operations (%)
North Atlantic	2	1,200	3.3
North Downey	22	13,200	36.2
Bellflower	2	1,200	3.3
East Wardlow	22	13,200	36.2
West Wardlow	22	13,200	36.2
Lakewood	3	1,800	4.9
South Redondo	22	13,200	36.2
South Cherry	5	3,000	8.2
Total	100	60,000	164.4

Source: US Department of Transportation, FAA, personal correspondence, November 24, 2003.

C-17 Engine Run-Up Tests

Boeing performs a single, identical, run-up test procedure for each individual C-17 aircraft produced prior to delivery (i.e., the procedure requires that tests are conducted at the same engine thrust for each aircraft). These tests are always performed at the same location and always between the hours of 7 A.M. and 9 P.M. on weekdays and 9 A.M. and 9 P.M. on weekends and holidays. While engine runs are allowed to take place into the evening, they are typically not performed after sunset. Boeing projects a limited number of such tests, totaling 16 per year through year 2008.

To characterize the noise levels produced by a C-17 aircraft engine run-up, one such test was surveyed on July 5, 2001, at a single measurement position located in the vicinity of the proposed residential development closest to the run-up area. The measurement position was approximately 35 feet above ground level on top of an existing water tank and approximately 3,200 feet northeast of the run-up position. (The elevated location was chosen to minimize the influence of acoustical screening from buildings closer to the runway).

As perceived from the measurement location, the engine run-up test was comprised of five separate audible events that were audible for periods ranging from 10 seconds to 69 seconds. A period of approximately 13 minutes elapsed between the start of the first audible event and completion of the last audible event. The measured single event levels for the individual events ranged from 67 to 79 (SEL). The maximum measured noise level during the C-17 engine run-up test was 71 dBA (L_{max}). All of the

measured single events for the C-17 engine run-up test were lower than the hypothetical typical sound exposure level for a single MD-80 commercial jet aircraft departure on Runway 30, which could be as high as 85 SENEL at the monitoring position. A summary of measured noise levels is provided in Appendix P of the Noise Assessment Technical Report.

717 Engine Run-Up Tests

Boeing 717 engine tests are conducted in the engine run-up area, which is also used as a staging area for commercial delivery and has a capacity to support up to 10 aircraft in the engine run-up area at any time. Each aircraft is tested individually based on the production schedule, delivery date, and specific engine functions checked. Engine tests vary from brief periods of idle (10 to 30 minutes) to full-thrust runs (1 to 5 minutes) throughout the day and may occur for a second day depending upon whether problems are encountered. It is not typical for two or more aircraft to be at full thrust at the same time. While engine tests are allowed to take place Monday through Sunday 7 A.M. to 9 P.M., primary hours of operation typically occur Monday though Friday 7 A.M. to 5 P.M. Boeing projects a 717 production rate of 12 per year through year 2005.

Test flights are performed for each aircraft and include Boeing test flights, customer acceptance flights, and customer delivery flights. Boeing pilots or customer pilots power off the Boeing Delivery Center ramp located within the Boeing Enclave onto the airport runway, take off and land, then power back to the ramp. The aircraft may return to the ramp for further engine checks including additional engine run-ups at the ramp. The aircraft may or may not take another test flight based on the requirements of the customer. These test flights are accounted for in the LBMC Chapter 16.43 noise budget.

To characterize the noise levels produced by a 717 aircraft engine run-up, one such test was surveyed on July 17, 2003. The existing water tank position used in the C-17 measurement could not be used for this survey, since Building 41 (approximately 100 feet high) was located between the engine run-up positions and the measurement position. To avoid acoustical screening from this building, an alternate monitoring position was selected, which was located approximately 1,410 feet north-northwest of the engine run-up area along Cover Street. This position was at a similar horizontal angle to the aircraft engine axis that would exist at the C-17 monitoring position located on top of the existing water tank. Noise measurements were conducted at approximately 5 feet above grade to replicate ambient noise conditions for proposed land uses. Noise levels at the water tank monitoring location were estimated from the measured noise data by simply adding a 6-dBA correction per doubling of distance for the increased distance of the monitoring position from the engines compared to the noise survey location. A summary

of measured noise levels is provided in Appendix P of the Noise Assessment Technical Report.

With reference to the measured noise levels, noise levels can be seen to vary, generally rising as the engine thrust was increased. The highest maximum (L_{max}) noise level measured was 91 dBA. Taking this worst-case measured noise level and applying the 6 dBA acoustical loss for distance discussed above, results in an estimated noise level of 87 dBA at the water tank monitoring location of the Boeing C-17 engine run-up tests. The measured maximum noise levels for the 717 engine run-up test would be similar to the hypothetical typical sound exposure level for a single MD-80 commercial jet aircraft departure on Runway 30, which could be as high as 85 SENEL at the monitoring position.[255]

(iii) Traffic Noise

Motor vehicles traveling on freeways, arterials and collector streets are a major source of noise in the Cities of Long Beach and Lakewood. Short-term, 15-minute noise measurements were conducted at five segments of arterial roadways at the rights-of-way to determine ambient noise levels in the project area. Figure 53 on page 511 shows the measurement locations. The measurement locations were selected based on their proximity to the project site and were focused on sensitive land uses. The measurement data indicate L_{eq} levels ranging from 68.0 to 75.1 dBA during the peak traffic hours, and levels ranging from 64.0 to 73.5 dBA during the off-peak hours. These noise levels are indicative of noise levels at the right-of-way and noise levels at more distant locations will be substantially less. As an example, a typical four-lane roadway with a sidewalk will result in a 3-dBA reduction in noise levels approximately 14 feet from the right-of-way and a 6-dBA reduction will occur approximately 48 feet from the right-of-way. A 24-hour measurement was also conducted on the northern end of the project site, 15 feet from the right-of-way of Carson Street. The measurement resulted in an L_{eq} of 69.9 dBA, with a CNEL of 73.6 dBA. Table 33 on page 516 provides a summary of the noise measurement data.

Existing noise levels were also estimated using the Federal Highway Administration (FHWA) traffic noise prediction model and existing traffic data provided by Crain &

[255] *SENEL and L_{max} do not have a linear relationship. However, SENEL is typically 5 to 10 dBA higher than L_{max}.*

Table 33

AMBIENT NOISE MEASUREMENT DATA

Measurement Number[a]	Time	Duration[b,c]	A-Weighted Sound Pressure Level (dBA)		
			L_{max}	L_{min}	L_{eq}
1	07:03	15 minutes	83.1	52.6	73.9
	10:05	15 minutes	78.9	49.7	67.4
	14:52	15 minutes	93.0	52.9	70.5
	16:05	15 minutes	82.4	55.1	69.4
	19:33	15 minutes	80.5	51.8	69.1
	22:30	15 minutes	77.2	46.0	65.5
2	07:24	15 minutes	83.0	47.1	72.7
	10:27	15 minutes	84.2	50.5	70.8
	13:04	15 minutes	81.9	49.6	70.6
	16:32	15 minutes	80.5	50.0	71.0
	19:55	15 minutes	78.2	47.5	68.3
	22:52	15 minutes	93.9	44.9	69.2
3	07:43	15 minutes	81.6	49.4	72.5
	10:51	15 minutes	81.9	54.6	72.7
	13:23	15 minutes	87.0	54.2	73.5
	16:58	15 minutes	86.5	48.0	75.1
	20:20	15 minutes	81.0	51.7	71.1
	23:15	15 minutes	79.9	44.4	67.4
4	08:03	15 minutes	83.6	47.3	68.0
	11:12	15 minutes	79.4	50.3	69.7
	13:51	15 minutes	80.8	49.5	69.9
	17:20	15 minutes	80.9	49.4	72.5
	20:45	15 minutes	79.2	46.8	68.7
	23:40	15 minutes	79.5	44.0	67.3
5	08:24	15 minutes	85.0	53.9	71.9
	11:42	15 minutes	82.7	53.8	72.7
	14:15	15 minutes	85.6	51.7	70.9
	17:42	15 minutes	82.0	55.4	72.1
	21:10	15 minutes	76.6	50.4	67.0
	00:02	15 minutes	77.0	45.1	64.0
6	09:00	24 hours	91.9	38.15	69.9

[a] *Receptor locations are at the roadway right-of-way and are shown on Figure 53 on page 511.*

[b] *15-minute measurements were conducted August 8, 2001, for each time period as follows: morning peak (7 to 9 A.M.), midmorning (10 A.M. to 12 P.M.), midday (1 to 3 P.M.), evening peak (4 to 6 P.M.), late evening (7 to 9 P.M.), and nighttime (10 P.M. to 12 A.M.).*

[c] *The 24-hour measurement was conducted August 7-8, 2001. The calculated CNEL is 73.6.*

Source: PCR Services Corporation, 2004.

Associates.[256] Table 34 on page 518 provides the estimated existing traffic noise levels at the right-of-way, 50 feet from the right-of-way, and 100 feet from the right-of-way for the selected roadway segments. The predicted CNEL from existing vehicular traffic range from 56.2 to 70.9 dBA at 50 feet from the right-of-way of the analyzed roadway segments. The existing CNEL from traffic along the analyzed roadway segments and traffic volumes are provided in Table A-1 of the Noise Assessment Technical Report. These noise levels decrease as the distance from the roadway is increased or as features such as block walls, structures or landscaping are introduced.[257]

(iv) Ground-Borne Vibration

The predominant source of vibration in the project vicinity is heavy trucks traveling on the local roadways. Other possible sources of vibration located in the vicinity of the southern portion of the project site may include Airport operations (primarily jet aircraft and helicopters) and Boeing's engine run-up area, where low frequency noise from these sources could cause rattling of doors and windows.[258]

(v) Ongoing Remediation Activities

As discussed in detail in Section V.E. Hazards, a soil and groundwater remediation program is presently being implemented at the project site in accordance with Cleanup and Abatement Order 95-048 issued by the California Regional Water Quality Control Board, Los Angeles Region. The remediation and associated demolition activities result in noise from the use of heavy-duty earthmoving equipment and control equipment (e.g., soil vapor extraction systems, pumps, and motors). These sources of noise affect the existing ambient community noise levels to a much lesser extent than the other sources described above.

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[256] *The actual short-term (15-minute) measurements are consistent with the modeled traffic noise levels. The FHWA traffic noise model (FHWA-RD-77-108) was used to model existing and all future L_{eq} traffic noise levels. This methodology allows for evaluation of the Average Daily Traffic Volumes provided by the Traffic Technical Report. This methodology also avoids use of inaccurate data that often results from monitoring during atypical traffic conditions (e.g., periods with reduced or increased vehicle volumes over a specific time frame which can generate atypical noise conditions). Such atypical traffic conditions are generally unpredictable.*

[257] *A typical four-lane roadway with a sidewalk would result in a 3-dBA reduction in noise levels approximately 14 feet from the right-of-way and a 6-dBA reduction approximately 48 feet from the right-of-way.*

[258] *Low frequency noise can travel long distances and it does not decay as rapidly as higher frequency noise. In addition, typical noise attenuation features such as noise barriers are not as effective for secondary vibration caused by low frequency noise. However, using new construction materials/methods that include weather-stripping can minimize rattling doors and windows.*

Table 34

PREDICTED EXISTING VEHICULAR TRAFFIC NOISE LEVELS

Analyzed Segments	Roadway Segment at Right-of-Way	Land Use	Predicted Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way		
			Adjacent	50 Feet	100 Feet
1	Atlantic Ave. North of Carson St.	Commercial	73.4	69.4	67.3
2	Bellflower Blvd. North of Carson St.	Residential	73.5	69.3	67.2
3	Candlewood St. West of Lakewood Blvd.	Residential	72.7	68.0	65.7
4	Carson St. West of Lakewood Blvd.	Residential	58.4	61.1	59.7
5	Carson St. East of Lakewood Blvd.	School	57.8	60.5	59.1
6	Carson St. East of Clark Ave.	Residential, Park	57.8	60.7	59.3
7	Cherry Ave. North of Carson St.	Residential	71.1	68.6	67.0
8	Conant St. East of Lakewood Blvd.	Golf Course	60.7	56.2	54.0
9	Conant St. East of Clark Ave.	Residential	61.3	56.8	54.6
10	Cover St. West of Paramount Blvd.	Commercial	71.0	65.4	63.1
11	Lakewood Blvd. North of Carson St.	Residential	74.7	70.2	68.0
12	Lakewood Blvd. North of Wardlow Rd.	Golf Course	75.1	70.9	68.7
13	Orange Ave. South of Wardlow Rd.	Residential, School	72.2	67.5	65.3
14	Paramount Blvd. South of Del Amo Blvd.	Residential	67.5	65.5	64.2
15	Paramount Blvd. North of Carson St.	Residential, School	67.1	65.2	63.8
16	Paramount Blvd. South of Carson St.	Commercial	71.1	66.3	64.1
17	Wardlow Rd. West of Cherry Ave.	Residential	69.0	65.4	63.5
18	Wardlow Rd. East of Cherry Ave.	Commercial	67.0	63.3	61.4
19	Wardlow Rd. East of Lakewood Blvd.	Golf Course	67.5	63.9	61.9

Source: PCR Services Corporation, 2004.

2. ENVIRONMENTAL IMPACTS

a. Methodology

A summary of the methodology used to evaluate noise and ground-borne vibration impacts that may result from project construction and long-term operations is provided below.

(1) On-Site Construction Noise

Noise impacts from construction activity are a function of noise generated by construction equipment, the equipment location, the sensitivity of nearby land uses, and the timing and duration of the noise generating activities. Noise impacts were evaluated based on the established methodology outlined in USEPA's "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, December 1971.

(2) Traffic Noise

Roadway noise impacts were evaluated using the FHWA traffic noise prediction model and forecasted data provided by Crain and Associates.[259, 260] The prediction model utilizes a three-dimensional coordinate system that allows the user to define roadway configurations, barrier type, and receiver locations. Roadway-noise attributable to project development was calculated and compared to baseline noise levels that will occur under the "no project" condition to determine significance.

(3) Airport Noise

In compliance with California Code of Regulation Title 21 and FAA Guidelines, the published Airport CNEL contours were used to assess potential noise impacts upon the proposed residential uses and associated outdoor recreational areas within the PacifiCenter development resulting from airport noise.

In addition, the Federal Interagency Committee on Aviation Noise (FICAN) in 1997 recommended use of a particular dose-response curve that can be used to estimate "the maximum percent of the exposed population expected to be behaviorally awakened" from the SENEL. This is referred to as the FICAN 1997 curve. This curve has been used to estimate population percentage awakenings for various interior SENEL levels.

(4) Aviation-Related Uses

Noise levels associated with proposed aviation-related uses (i.e., a possible corporate jet use) were compared to SENEL curves created using the Federal Aviation Administration's Industrial Noise Model (INM) Version 6.0. The SENEL curves were compared to Chapter 16.43 of the LBMC to determine potential significance.

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[259] *FHWA, The Federal Highway Administration's Traffic Noise Prediction Model FHWA RD-77-108, 1978.*

[260] *Crain & Associates, Traffic Impact Study Report for PacifiCenter, January 2004.*

(5) On-Site Activities

Noise levels associated with on-site activities (e.g., mechanical equipment, truck movements, parking facilities, continued use of engine run-up areas, a potential 66kV Substation) were assessed based on measured and referenced noise levels. Noise levels were determined at sensitive receptors by applying a hard-site distance attenuation factor and accounting for loss by intervening structures.

(6) Ground-Borne Vibration

Ground-borne vibration impacts were evaluated by identifying potential vibration sources, measuring the distance between vibration sources and surrounding structure locations, and making a significance determination.

b. Thresholds of Significance

In general, impacts to noise will be considered significant if the project will result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, if the project exposes people residing or working in the project area to excessive noise levels.

In order to determine if the project exceeds any of the general thresholds listed above, more specific noise thresholds are typically applied. The following specific significance thresholds were used to evaluate the project's short-term construction and

long-term operations impacts. These thresholds are based on applicable federal, state, and local policies and regulations described earlier.

(1) Construction Noise

Neither the City of Long Beach nor the City of Lakewood has established significance thresholds for construction noise impacts. In the absence of such thresholds and consistent with thresholds often used in other jurisdictions, including the City of Los Angeles, a significant impact associated with construction noise will result if: [261]

- Project construction activities lasting more than 10 days in a three-month period will exceed existing ambient exterior noise levels by 5 dBA L_{eq} or more at a noise sensitive use.

In addition, an evaluation of L_{max} noise levels is provided as part of the construction impact analysis. However, neither the City of Long Beach nor the City of Lakewood have established significance thresholds, and as such, the L_{max} discussion is provided for informational purposes only.

(2) Roadway Noise

Mobile noise sources, such as project-generated traffic traveling on public roadways, are exempt from the requirements of the City's of Long Beach and Lakewood Municipal Codes but still subject to CEQA. Therefore, the City of Long Beach and the City of Lakewood use the State Noise/Land Use Compatibility Matrix, provided earlier in Figure 51 on page 504, to define acceptable mobile source noise levels. Thus, a significant impact will occur if any of the significance thresholds listed below are exceeded:

- Project traffic causes an increase in CNEL along any roadway segment by 5 dBA or more when the CNEL is within the acceptable range as shown on the Community Compatibility Matrix.

- Project traffic increases the CNEL along any roadway segment by an audible amount (3 dBA or more) and causes the noise levels to move from acceptable range to unacceptable range as shown on the Community Compatibility Matrix.

[261] *L.A. CEQA Thresholds Guide, August 2001.*

(3) Airport Noise

In compliance with California Title 21, Caltrans' California Airport Land Use Planning Handbook, and FAA Guidelines, a significant impact will occur if proposed residential uses and associated outdoor recreational areas were located within the Airport 65 CNEL contour based upon the maximum-expected operating scenario allowed by LBMC Chapter 16.43.

(4) Aviation-Related Uses

In compliance with Chapter 16.43 of the LBMC, a significant impact will occur if proposed aviation-related uses will result in aircraft using the Long Beach Airport that will not comply with the Noise Ordinance SENEL limitations.

(5) On-Site Activities

The criteria and guidelines identified in the Regulatory Framework section above were used to determine operational noise impacts. Within the portion of the project site located within the City of Long Beach, a significant impact associated with on-site activities (i.e., aviation-related uses, mechanical, equipment, parking facilities) will occur during daytime (7:00 A.M. to 10:00 P.M.) and nighttime (10:00 P.M. to 7:00 A.M.) hours if:

- Exterior noise levels for predominantly residential or commercial uses exceed those set forth by Section 8.80.150 of the LBMC and presented in Table 28 on page 498. Noise levels in excess of the levels indicated in Table 28 are conditionally permitted, depending on the intensity of the noise and the duration of exposure. Specifically, noise levels may not exceed the exterior noise standard for a cumulative period of more than 30 minutes in any hour; or +5 decibels for a combined period of more than 15 minutes in any hour; or +10 decibels for a combined period of more than 5 minutes in any hour; or +15 decibels for a combined period of more than 1 minute in any hour; or +20 decibels for any period of time (maximum noise level). [262]

[262] *If the existing exterior ambient noise level exceeds that permissible within the noise limit categories, the allowable noise exposure standard is increased to ambient conditions (Section 8.80.150 of the LBMC). In addition, Section 8.80.240 of the LBMC (vehicle, motorboat or aircraft repair and testing) provides an exemption to the exterior noise limits (Section 8.80.150 of the LBMC) for aircraft within the airport property or within any other aviation-related property abutting it.*

- Interior noise levels for residential uses exceed those set forth by Section 8.80.170 of the LBMC and presented in Table 29 on page 499. Noise levels in excess of the levels indicated in Table 2 are conditionally permitted, depending on the intensity of the noise and the duration of exposure. Specifically, noise levels may not exceed the interior noise standard for a cumulative period of more than 5 minutes in any hour; or +5 decibels for a combined period of more than 1 minute in any hour; or +10 decibels for any period of time (maximum noise level). [263]

In addition, a significant impact will occur as a result of on-site activities in the City of Lakewood portion of the site if:

- In accordance with the LMC, any person within any area zoned for residential use or any area adjacent to residential use operates air conditioners, mechanical equipment, or mechanical machinery that causes the noise level at the residential property line to exceed 65 dBA L_{eq}.[264]

- In accordance with the LMC, commercial noise levels exceed 60 dBA L_{eq} at residentially zoned or occupied property.[265]

(6) Ground-borne Vibration

The City of Long Beach and Lakewood do not have any adopted policies or standards for construction ground-borne vibration. However, the Federal Transit Authority (FTA) provides a construction equipment vibration damage threshold criterion of 0.20 inch per second PPV for fragile buildings (U.S.DOT, 1995). In the absence of any City significance thresholds for vibration associated with construction, an exceedance of the FTA standard was used to determine construction vibration impacts.

The City of Long Beach's vibration perception criteria described above will be used to evaluate potential impacts associated with operation of the project site. A significant impact will occur if:

[263] *If the existing interior ambient noise level exceeds that permissible within the noise limit categories, the allowable noise exposure standard is increased to ambient conditions (Section 8.80.170 of the LBMC). Section 8.80.240 of the LBMC (vehicle, motorboat or aircraft repair and testing) provides an exemption to the interior noise limits (Section 8.80.170 of the LBMC) for aircraft within the airport property or within any other aviation-related property abutting it.*

[264] *LMC, Section 9376.*

[265] *LMC, Section 9347.*

- Project operation activities cause a RMS of 0.01 inch/sec at or beyond the property boundary of the source if on a private property or at 150 feet from the source if on a public space.

c. Project Features

(1) Construction

The following project features will be included to reduce noise levels in the surrounding communities and on-site proposed residential uses.

- The project applicant will provide a construction relations officer to serve as liaison with surrounding communities and on-site proposed residents.
- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained muffler exhaust systems.
- Construction activities will be scheduled to the extent feasible so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.
- Engine idling from construction equipment such as dozers and haul trucks will be limited, to the extent feasible.
- Construction routes will be established to avoid residential streets in order to prevent noise and vibration impacts in residential areas. Generally, construction delivery and haul trucks will access the project site from I-405 along Lakewood Boulevard or along Cherry Boulevard.

(2) Residential

Project features will be incorporated to provide insulation for all residential buildings on the project site to reduce interior noise levels below 45 dBA CNEL. Achieving this level of sound insulation may include the following: (1) air-conditioning/mechanical ventilation such that the units will not have to rely on open windows for ventilation; (2) dual insulating glazed systems; (3) doors and windows opening to the exterior with acoustical seals; (4) adding insulation to attics; and/or (5) fitting chimneys and vents with dampers and/or

acoustic louvers.[266] The residential developer will incorporate necessary measures during the detailed design stage of the project to comply with the minimum sound insulation design standard. The project features included to reduce noise levels at residences from aircraft noise will also serve to reduce noise levels from parking facilities.

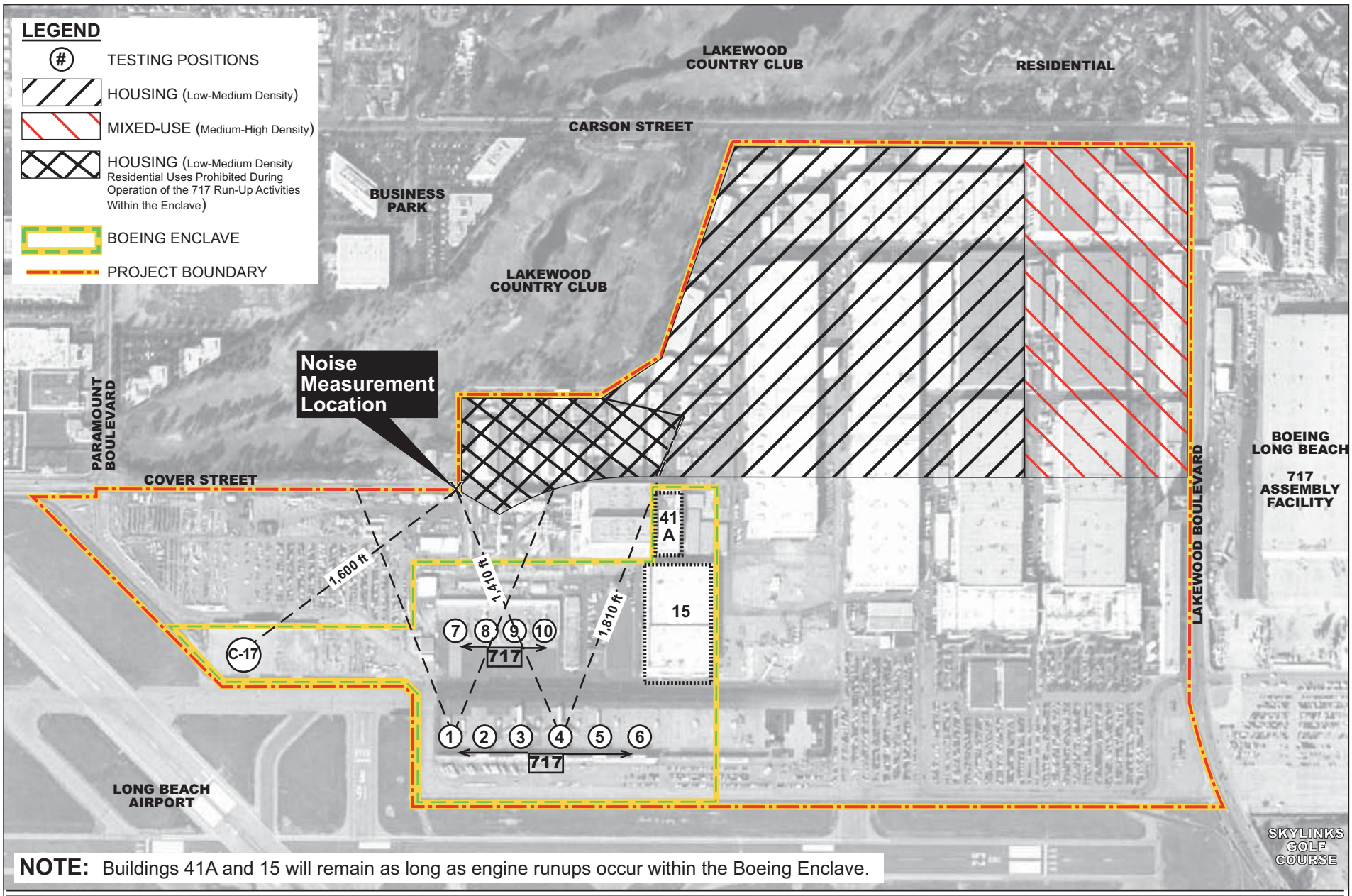
The project will also limit the development of residential uses in close proximity to the Boeing Enclave until such time that run-up activities permanently cease in the 717 run-up area. Please see Figure 54 on page 526 for a delineation of this zone. Also, Boeing will preferentially use the testing positions along the southern side of the Boeing Enclave (Numbers 1-6). These testing positions have the tail end of the planes (i.e., engines) facing towards the airport and, more importantly, away from proposed residences.

In addition, all persons purchasing, leasing, or renting residential land or property within the PacifiCenter development will be required to sign an "acknowledgement covenant" which acknowledges, the fact that residential properties are near an airport, that there may be low level aircraft overflights, and that there may be noise impacts because of proximity to the Airport and overflights. In addition, the acknowledgement covenant shall acknowledge the avigation easements, which waive the right to take legal action in connection with aircraft noise.

(3) Parking Facilities

The floors of parking structures will utilize a broom finish to minimize noise from tires, and 42-inch solid spandrels will be used to reduce noise transmission. Parking structures will also include walls or barriers in the design that assist in blocking the line-of-site from sensitive receptors to parking stalls. Landscaping will be provided along the exterior of all parking structures and surface parking lots to assist in buffering noise. In addition, project features specified above to reduce noise levels at residences from aircraft noise will also reduce noise levels from parking facilities.

[266] *The primary path of aircraft noise into buildings is usually through the windows, so the acoustical performance of buildings is strongly dependent upon the type, location, and size of windows. If the windows are acoustically treated, then other building components become acoustically significant. For this reason, sound insulation programs almost always include windows and doors with acoustically-rated assemblies. In addition, most programs include insulation of attic spaces, and sealing or baffling of openings and vents to limit the effects of other common building elements on the interior noise levels. Fireplaces may also be treated with chimney cap dampers or glass doors. The use of these measures can provide up to 35 dB aircraft noise reduction (California Airport Land Use Planning Handbook (January 2002).*



PCR

Scale not Provided

Figure 54
Boeing 717 Engine Run-Up Noise and Proposed Residential Uses

Sources: Boeing Realty Corporation and PCR Services Corporation, 2004

(4) 66kV Substation

A 66-kV substation with a maximum footprint of approximately 305 feet by 230 feet is proposed within either the Commercial or Housing areas of the site. As discussed in Section V.M. Energy, this substation is anticipated to be developed around the year 2009 and will serve the project site as well as other off-site areas. An illustration of potential areas within the site that may be utilized for this substation is provided in Section III, Project Description. If located in the residential portion of the project site or fronting A Street in the commercial area, the substation will be a low profile structure (equipment will be approximately 12 feet in height) with underground feed lines, with an 8-foot perimeter masonry screen wall located at the building setback line, and associated perimeter landscaping between the right-of-way and the wall consisting of trees, shrubs, and ground cover. If the substation is located in the commercial area not fronting on A Street, the equipment will be approximately 20 feet in height and will include an 8-foot masonry wall located at the building setback line with landscaping between the right-of-way and the wall. Such landscaping will include trees, shrubs, and ground cover.

(5) Mechanical Equipment

All mechanical equipment will incorporate noise control measures to ensure that City of LBMC and LMC requirements are satisfied.

d. Analysis of Project Impacts

(1) Noise

The project site and vicinity will be exposed to noise generated by intermittent construction activities associated with the proposed project, vehicular traffic from the project and other ambient traffic growth, and aviation-related uses. Similar to existing on-site conditions, other sources of noise from the project site will include aircraft engine run-up, power substation, mechanical equipment, truck deliveries, trash pickups, and parking facilities. The future noise levels associated with each of these noise sources are discussed in the following sections.

(a) Construction Noise Levels

Noise impacts from construction activities occurring within the project site will be a function of the noise generated by construction equipment, the equipment location, and

the timing and duration of the noise-generating activities. Construction activities will include six stages: (1) demolition;[267] (2) site preparation; (3) excavation; (4) foundation construction; (5) building construction; and (6) finishing and cleanup. Each stage involves the use of different kinds of construction equipment and, therefore, has its own distinct noise characteristics. As discussed above in the Regulatory Framework, construction activities will be limited to the hours specified in the Long Beach Municipal Code, which is more restrictive than the Lakewood Municipal Code, thereby limiting the hours during which construction noise will be generated.

The nearest sensitive receptors with potential to be disturbed by construction activities include single-family residences located on the north side of Carson Street. These residential structures are located approximately 125 feet from the closest project construction and approximately 175 feet from the nearest construction area. In addition, a nine-foot wall separates the residences from Carson Street and the project site. This 9-foot wall was built to reduce traffic-related noise levels, but will also reduce construction noise levels by approximately 9 dBA.[268] The closest non-residential sensitive receptor is the Herbert Hoover Middle approximately 2,700 feet northwest of the project site and is well screened from the project site by the 9-foot wall along Carson Street. In addition, Long Beach City College is located approximately 500 feet west of the project site and 550 feet from the nearest construction area. However, Long Beach Community College is well shielded from any potential noise from the project site, as several large buildings east of Lakewood Boulevard are located between the project site and such uses.

As with most development projects, construction will require the use of mobile heavy equipment with high noise level characteristics. Individual pieces of construction equipment that will be used for project construction and referenced noise levels are provided in Table 35 on page 529. As indicated in Table 35, construction equipment will produce maximum noise levels of 74 dBA to 101 dBA at a reference distance of 50 feet from the noise source. These maximum noise levels will occur when equipment is operating under full power conditions or during "impact" activities such as pile driving, jack hammering, or sawing. Using the industry standard sound attenuation rate of 6 dB per doubling of distance for point sources (e.g., construction equipment), a noise level of 101 dBA at a distance of 50 feet will be about 95 dBA at 100 feet, and 89 dBA at 200 feet.

[267] *Some demolition activities associated with the remediation program underway within the project site may overlap with project construction activities. In addition, when activities within the Boeing Enclave cease, the Boeing Enclave may be demolished as part of the remediation program or as part of the project. For purposes of providing a conservative analysis, it is assumed that demolition of the Boeing Enclave will occur as part of the proposed project*

[268] *EPA, Noise from Construction Equipment and operations, Building Equipment and Home Appliances, PB 206717, 1971.*

Table 35

CONSTRUCTION EQUIPMENT MAXIMUM NOISE LEVELS

Equipment	Noise Level (dBA) at 50 feet
Air Compressor	81
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	81
Grader	85
Jack Hammer	88
Loader	85
Paver	89
Pile Driver (Impact)	101
Pile Driver (Sonic)	96
Pneumatic Tool	85
Pump	76
Roller	74
Saw	76
Scraper	89
Truck	88

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, 1995.

As heavy equipment passes near the project site boundary, the maximum noise level at a given moment at the nearest residential receptor could reach as high as 93 dBA, but noise levels will be reduced to 84 dBA with consideration of barrier insertion loss from the existing sound wall. As the equipment travels toward the center of the project site, the maximum noise level at the property line will diminish considerably into the 60s dBA. These estimated maximum noise levels will not be continuous, nor will they be typical of noise levels throughout the construction period.

Equipment used on construction sites often operates under less than full power conditions, or part power. Actual measurements performed while equipment is performing work indicate that shift-long equivalent L_{eq} sound levels are typically 2 dBA to 15 dBA less than maximum noise levels. For project-long equivalent L_{eq} levels, these values can be

further reduced to account for the percentage of time that equipment actually operate on the construction site.[269] Table 36 on page 531 lists the highest noise levels associated with each phase of construction. These estimated construction noise levels are governed primarily by the high noise-producing pieces of equipment to be used and represent conservative worst-case conditions in which the maximum amount of construction equipment will be operating during a one-hour period. These estimated maximum hourly noise levels will not be typical of noise levels throughout the construction period. To account for multiple construction crews operating in close proximity to each other, a maximum 89 dBA L_{eq} at 50 feet was used as a worst-case construction L_{eq}. The estimated aggregate construction noise levels during the heaviest periods of activity at each receptor are provided in Table 37 on page 531. Table 37 shows that the residences located to the north of the project site along Carson Street (Receptor 2) will occasionally experience construction noise levels of 70 dBA (hourly L_{eq}) during the heaviest periods of construction. If pile driving is required in the northern section of the project site along Carson Street, nearby residences could experience maximum noise levels of 84 dBA. As the worst-case hourly L_{eq} exceeds ambient noise levels by more than the 5 dBA incremental significance threshold, construction of the proposed project will result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity and a significant impact to off-site sensitive receptors without incorporation of mitigation measures.

Since proposed residential areas will be constructed prior to project buildout and construction of the 66kV Substation, on-site sensitive receptors could be located as close as 75 feet from a construction zone and will therefore occasionally experience construction noise levels as high as 83 dBA. If pile driving is required on-site, sensitive receptors could experience maximum noise levels of 98 dBA. These noise levels will be considerably higher than ambient noise levels. As the worst-case hourly L_{eq} will be more than the 5-dBA incremental significance threshold, the proposed project will result in a significant impact to proposed on-site sensitive receptors without incorporation of mitigation measures. However, such noise levels will be experienced for short-durations as only portions of the project site will be under construction at any one time. The majority of the time construction noise levels at on-site sensitive locations will be much lower due to reduced construction activity and the phasing of construction (i.e., construction noise levels at a given location will be reduced as construction activities conclude or move to another more distant location of the site). Furthermore, the estimated highest noise levels do not account for shielding that may be provided by future structures located between construction activity areas and adjacent receptors.

[269] *Beranek and Ver, Noise and Vibration Control Engineering, Principles and Applications, p. 652, 1992.*

Table 36

OUTDOOR CONSTRUCTION NOISE LEVELS WITH MUFFLERS

Construction Stage	L_{eq} (dBA) at 50 feet
Ground Clearing	82
Excavation, Grading	86
Foundation	77
Structural	83
Finishing	86

Source: EPA, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, PB 206717, 1971.

Table 37

HIGHEST ESTIMATED L_{eq} CONSTRUCTION NOISE LEVELS AT RECEPTOR LOCATIONS (During Heaviest Periods of Construction Activity for One-Hour Period)

Receptor Number and Land Use [a]	Presumed Ambient Noise Level (dBA) [b]	Distance to Construction Zone (feet)	Predicted Aggregate Construction Noise (dBA) [c]	Predicted Pile Driving Noise (dBA)
1-Residential	60	1,850	58	70
2-Residential	60	175	70 [d]	84 [d]
3-School	60	2,700	45 [d]	57 [d]
On-site Residential	60	75	86	98

[a] *Receptors are shown in Figure 53.*
[b] *Based on the exterior noise level standards identified in Table 1 (LBMC Section 8.80.150).*
[c] *Based on heaviest period of construction activity over a one-hour period.*
[d] *A 9 dB noise reduction adjustment was applied to the calculated value to account for shielding and barrier effects from the ten-foot sound wall along Carson Street.*

Source: PCR Services Corporation, 2004.

Based on the size of the project, a number of delivery trucks and haul trucks will require access to the site on a daily basis. Therefore, a project feature has been included to avoid sensitive land uses (e.g., schools and residences) by accessing the project site from the I-405 along Lakewood Boulevard and Cherry Boulevard.

(b) Traffic Noise Levels

The traffic noise analysis considered the roadway configuration, percentage of 2-axle and 3-axle trucks, 24-hour count data to develop day/evening/night split, average vehicle speeds, and right-of-way distances to calculate future traffic noise levels. Table 38 on page 533 provides the estimated traffic CNEL at the selected roadway segments for the following scenarios for year 2020: ambient growth without the project; ambient growth plus project development; and ambient growth plus project development plus all traffic mitigation. Table 38 also lists the project-related increase in CNEL above future without project noise levels and the cumulative increase in CNEL above existing traffic noise levels. As indicated therein, existing CNEL traffic noise levels at 50 feet from the right-of-way of the analyzed segments range from 56.2 to 70.9 dBA. Future without project CNEL traffic noise levels (ambient growth without the project) at the segment locations will range from 57.1 to 71.7 dBA. Future CNEL noise levels with ambient growth plus project development and all traffic mitigation measures will range from 61.3 to 73.5 dBA for the roadway segments. The future traffic-generated CNEL along the analyzed roadway segments and traffic volumes are provided in Appendix P of the Noise Assessment Technical Report.

Compared with the future without project conditions, the increase in future predicted CNEL with ambient growth plus project development and all traffic mitigation will be a maximum of 4.3 dBA and will be less than significant for all off-site roadway segments because it will be less than the 5 dBA significance threshold, with the exception of Conant Street east of Lakewood Boulevard (Roadway Segment No. 8), which will increase by 7.0 dBA. This roadway segment is bordered by parking facilities and the Boeing 717 Assembly Facility. While noise levels associated with project traffic at this roadway segment will result in a significant and unavoidable impact, no sensitive receptors will be impacted. An additional analysis was completed for A Street located within the western portion of the site as this street may be located farther to the north and adjacent to the Lakewood Country Club Golf Course (in the vicinity of where Cover Street is currently located). Given the low level of traffic that currently travels on in this area, mobile noise levels were predicted to increase by 18.7 dBA. However, this roadway segment is bound by the Airport to the south and a golf course to the north, and, therefore no sensitive residential receptors will be impacted. Nonetheless, noise levels associated with project traffic at this roadway segment will result in a significant and unavoidable impact.[270]

[270] *In addition, predicted project traffic related noise levels will drop below airport noise CNEL noise levels at approximately 175 feet north of the roadway right-of-way which is based on a 4.5 dBA per doubling of distance drop-off rate for soft sites (i.e., soft dirt, grass or scattered bushes and trees).*

Table 38

PREDICTED FUTURE TRAFFIC NOISE LEVELS—PROJECT BUILDOUT (2020)

Roadway Segment #	Roadway Segment	Existing CNEL	Predicted Future CNEL (dBA) at 50 feet from the Right-of-Way				
			Ambient Growth Without Project [a]	Ambient Growth With Project	Ambient Growth Plus Project and All Traffic Mitigation	Project Increase [b]	Cumulative Increase [c]
1	Atlantic Avenue North of Carson Street	69.4	70.2	70.2	70.2	0.0	0.8
2	Bellflower Boulevard North of Carson Street	69.3	69.7	69.9	69.9	0.2	0.6
3	Candlewood Street West of Lakewood Boulevard	68.0	69.4	69.4	69.4	0.1	1.5
4	Carson Street West of Lakewood Boulevard	61.1	62.0	62.5	62.5	0.5	1.4
5	Carson Street East of Lakewood Boulevard	60.5	61.1	61.9	61.8	0.7	1.3
6	Carson Street East of Clark Avenue	60.7	61.2	61.8	61.6	0.4	0.9
7	Cherry Avenue North of Carson Street	68.6	69.3	69.6	69.9	0.6	1.3
8	Clark Avenue North of Conant Street	68.3	68.7	69.0	68.9	0.2	0.6
9	Clark Avenue South of Conant Street	67.3	67.7	67.7	67.8	0.1	0.5
10	Conant Street East of Lakewood Boulevard	56.2	57.5	64.9	64.5	7.0	8.3
11	Conant Street East of Clark Avenue	56.8	57.1	61.7	61.4	4.3	4.6
12	Cover Street West of Paramount Boulevard	65.4	65.9	69.4	69.2	3.3	3.8
13	Lakewood Boulevard North of Carson Street	70.2	70.5	71.7	71.6	1.1	1.4

Table 38(Continued)

PREDICTED FUTURE TRAFFIC NOISE LEVELS—PROJECT BUILDOUT (2020)

Roadway Segment #	Roadway Segment	Existing CNEL	Predicted Future CNEL (dBA) at 50 feet from the Right-of-Way: Ambient Growth Without Project [a]	Ambient Growth With Project	Ambient Growth Plus Project and All Traffic Mitigation	Project Increase [b]	Cumulative Increase [c]
14	Lakewood Boulevard North of Wardlow Road	70.9	71.7	73.7	73.5	1.9	2.7
15	Orange Avenue South of Wardlow Road	67.5	67.6	67.6	67.6	0.0	0.1
16	Paramount Boulevard South of Del Amo Boulevard	65.5	66.4	67.4	66.9	0.5	1.4
17	Paramount Boulevard North of Carson Street	65.2	66.2	67.5	67.0	0.8	1.8
18	Paramount Boulevard South of Carson Street	66.3	67.8	69.5	68.9	1.1	2.6
19	Wardlow Road West of Cherry Avenue	65.4	66.1	66.3	66.3	0.2	0.9
20	Wardlow Road East of Cherry Avenue	63.3	63.8	63.9	63.9	0.0	0.5
20	Wardlow Road East of Lakewood Boulevard	63.9	64.6	66.7	66.5	1.9	2.6

[a] *Includes ambient traffic growth projected through year 2020.*

[b] *Increase relative to traffic noise levels associated with ambient growth without the project, resulting from ambient growth plus project development and all traffic mitigation.*

[c] *Cumulative increase relative to existing traffic noise levels, resulting from ambient growth plus project development and all traffic mitigation.*

Source: PCR Services Corporation, 2004.

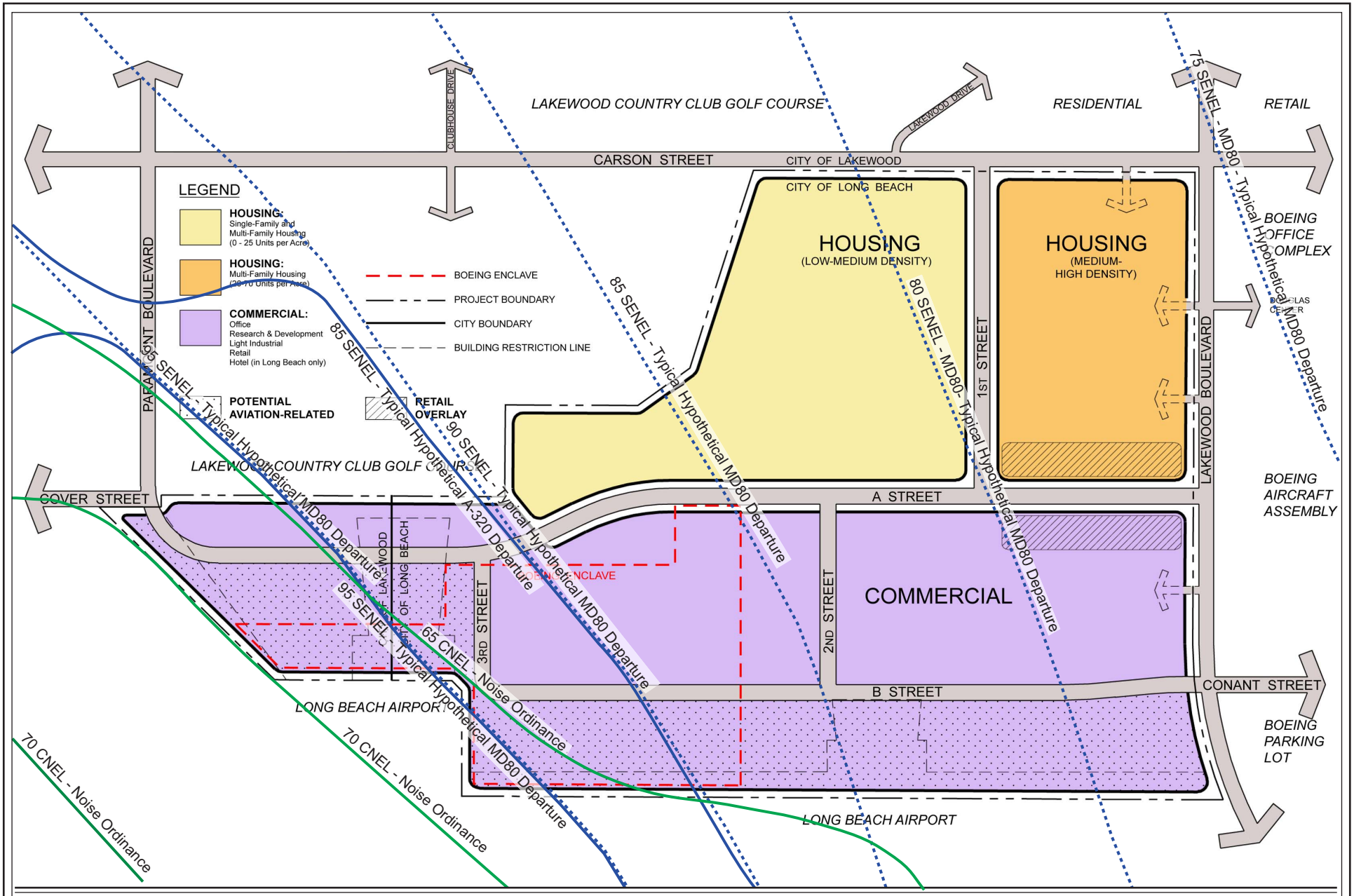
Additional analysis was conducted to account for the increase in heavy duty truck trips associated with any accessory warehouse uses. If the project were to include up to the permitted amount of warehouse uses in the PCC-1 and PCC-2 areas, roadway noise levels will increase by a maximum of 0.1 dBA over the project noise levels displayed in Table 38 at roadways where heavy duty trucks are likely to travel. Therefore, increased heavy duty truck trips associated with potential warehouse uses will not significantly exacerbate the impact at Conant Street east of Lakewood Boulevard nor create new significant impacts.

(c) Airport Noise Exposure at the Site

In compliance with the policies of the ALUP, California Title 21, and FAA Guidelines, the published Airport CNEL contours were used to assess potential noise impacts upon the proposed residential uses and associated outdoor recreational areas within the PacifiCenter development resulting from airport noise. LBMC Chapter 16.43.050(A) states that, "it is the goal of the City that incompatible property in the vicinity of the Airport shall not be exposed to noise above 65 CNEL." CNEL noise contours produced by landing and takeoff activity at the Airport, which are based upon the maximum expected operating scenario allowed by LBMC Chapter 16.43, are shown in Figure 55 on page 536. As indicated by Figure 6, the residential uses and associated outdoor recreational areas proposed within the PacifiCenter site will be outside of the 65 CNEL contour. Therefore, the project will not expose people residing or working in the project area to excessive noise levels and noise impacts from airport operations upon such land uses such as residential development and associated outdoor recreational areas will be less than significant since these uses will be exposed to appreciably lower noise levels than cited by California Title 21, FAA Guidelines, and LBMC policy.

Consistent with the ALUP, Title 21 of the California Code of Regulations, Division 2.5 (Caltrans, Division of Aeronautics), requires a minimum standard of exterior sound transmission control for residential buildings that are located within the 65 CNEL contour such that internal noise levels due to external noise sources should not exceed 45 dB CNEL for habitable rooms. Although proposed residential buildings will be outside of the 65 CNEL contour, project features discussed above will be incorporated into the project to ensure that all habitable rooms of residential buildings on the project site will not exceed 45 dB CNEL.

The SENEL noise contours illustrated in Figure 55 show a hypothetical typical sound exposure level for a single MD-80 and A-320 commercial jet aircraft departure on



Source: MVE Architects, January 2004

Figure 55
Airport Compatibility with Future Proposed Project Land Uses

Runway 30.[271] While the MD-80 and A-320 commercial jet departures are the most common air carrier departure operations, other aircraft will generally produce less noise, while some may on occasion be louder. The SENEL exposure for the proposed residential uses within PacifiCenter located closest to the Airport from the louder typical MD-80 departure could be as high as 90 SENEL, which with typical residential outside-to-inside modern construction noise insulation of 25 dBA will yield an internal 65 SENEL.[272]

The Federal Interagency Committee on Aviation Noise (FICAN) in 1997 recommended use of a particular dose-response curve that can be used to estimate "the maximum percent of the exposed population expected to be behaviorally awakened" from the SENEL. This is referred to as the FICAN 1997 curve. This curve has been used to estimate population percentage awakenings for various interior SENEL levels. In evaluating the typical MD-80 departure contour supplied by the City of Long Beach and based upon data published by FICAN in 1997, an interior noise level of 65 SENEL corresponds to only a five percent probability of awakening.[273] Also, with the exception of general aviation, the Airport has a curfew that limits operations to between 7 A.M. and 10 P.M. Although there is no established significance threshold for SENEL, the low probability of awakening from a typical MD-80 departure coupled with the fact that the Airport has a curfew, indicates a low possibility of such sleep disruption.

As discussed earlier, a "satisfactory conversation" can be obtained with a steady sound level of up to 64 dBA. Therefore, an internal 65 SENEL during a typical MD-80 departure could be intermittently problematic from a speech interference level. In addition, during outdoor activities aircraft operations may briefly interfere with speech communication. Airport related noise complaints concentrate along the arrival and departure flight track for Runway 12/30 and to a much lesser extent north of Carson Street. Based on general aviation flight track data provided by the City of Long Beach Airport Bureau, the predominant east/west (7L/25R and 7R/25L) runway flight pattern results in over flights north of Carson Street and does not impact the project site. The north/south (16L/34R and 16R/34L) runway flight pattern results in few complaints as it is used infrequently due to the short runway length, limitation for only visual operations, and curfew after 10:00 P.M. These overflights may be a source of annoyance to proposed sensitive receptors on the project site as a portion of the proposed residential uses are

[271] *City of Long Beach, Airport Bureau, Written Communication, May 2001 and Jet Blue Long Beach Airport Analysis, May 29, 2001.*

[272] *California Land Use Planning Handbook, January 2004.*

[273] *FICAN, Annual Report Federal Interagency Committee on Aviation Noise, 1997.*

within the 60 CNEL contour and the general community attitude toward a CNEL of 60 dB results in approximately seven percent of the population to be highly annoyed.[274]

The Airport has approximately 60,000 annual helicopter operations per year in which the predominant east/west configuration is used most of the time and inbound and outbound routes occur between 7L/25R and 7R/25L generally in line with Wardlow Road. Thus the majority of potential helicopter flights do not occur over the project site. In fact, as shown in Table 32, only approximately 39 helicopter overflights occur over the project site per 24-hour period and typically occur during daytime hours. Emergency services helicopters also operate out of the Airport. The Los Angeles Sheriff's Department typically has two to six operations per night which travel north across the project site following Downey Avenue. In addition the Long Beach Police Department has eight to ten operations per night and typically take the most direct path to the emergency, which could occur across the project site. These events are infrequent and are unscheduled. Noise measurements conducted for overflight helicopter operations on the project site resulted in a maximum noise level of 72 dBA during departure and 75 dBA during an approach for a R-22 helicopter. These noise levels will not be problematic from a speech interference level as aircraft related interior noise levels will be below 64 dBA L_{eq}. Also, project features discussed above will be incorporated into the project to ensure that all habitable rooms of residential buildings on the project site will not exceed 45 dB CNEL and will substantially lessen annoyance to residential uses.

(d) Aviation-Related Uses

The project could also include an optional component allowing for the continuation of a limited amount of aviation-related uses on the PacifiCenter site. The uses will primarily serve as an amenity to businesses at the project site and will include hanger space for corporate jets and line maintenance "A" checks.[275] As illustrated by the Federal Aviation Administration's Industrial Noise Model (INM) Version 6.0 SENEL curves provided in Appendix P-4 of the Noise Assessment, all reasonably foreseeable types of aircraft that may use the Airport will comply with LBMC Chapter 16.43 SENEL requirements. In addition, the proposed operations will not affect overall activity at the Airport since it must maintain compliance with LBMC Chapter 16.43 noise budgets. Furthermore, in accordance with the LBMC, if noise levels from general aviation exceed its

[274] *Source: Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992.*

[275] *Line Maintenance "A" checks are scheduled functional inspections performed from a checklist. The activities include lubrication of moving parts, servicing of fluids, inspection of components, hoses, electrical items and aircraft structure. Lighting and a ground power unit are used during these checks.*

cumulative noise budget, the General Aviation Noise Committee will institute voluntary noise reduction measures. If these voluntary procedures do not sufficiently reduce the cumulative noise levels after two calendar quarters, the Airport Manager will require mandatory reductions.

The potential aviation-related uses will employ several tugs, several service carts and auxiliary power units. These pieces of equipment will only be operated intermittently in support of aircraft operations. In addition, the structures related to the hanger space will be positioned between any aviation activity and adjacent on-site land uses, thus limiting the amount of noise perceptible from these operations. Therefore, noise levels associated with operation of the aviation-related uses will be less than significant.

(e) Boeing Engine Run-up Area

As discussed above, Boeing will continue to conduct engine run-up tests for newly manufactured 717 and C-17 aircraft in the Boeing Enclave. The published airport noise contours make no allowance for these ground activities. As discussed earlier, the project will limit the development of residential uses in close proximity to the Boeing Enclave until such time that 717 run-up activities permanently cease. Please see Figure 54 on page 526 for a delineation of this zone. In addition, Boeing will preferentially use the testing positions along the southern side of the Boeing Enclave (Numbers 1-6) so that the engines are facing away from proposed residential uses and towards the Airport.

With incorporation of project features, the closest proposed residential uses will be located approximately 1,810 feet northeast of the 717 engine run-up area. Adjusting the measured maximum noise levels measured in the engine run-up tests will result in a 717 maximum noise level of 88 dBA (L_{max}). Based upon the specified noise insulation that will be required for the completed residential buildings, the maximum internal noise level in a residential unit attributable to these tests will be approximately 63 dBA (L_{max}). As shown in Appendix B of the Noise Assessment Technical Report, the maximum L_{eq} for the 717 engine run-up testing will occur for approximately five minutes and will result in a 78 dBA exterior or 53 dBA interior noise level at the closest proposed residential uses. This interior noise level will not be expected to significantly interfere with typical speech communication, watching television or similar activities taking place indoors. However, 717 engine run-up noise may interfere with speech communication during outdoor activities.

The closest proposed residential uses will be located approximately 1,600 feet northeast of the C-17 run-up area. Adjusting the measured maximum noise levels measured in the engine run-up tests will result in C-17 maximum noise level of 83 dBA

(L_{max}). Based upon the specified noise insulation that will be required for the completed residential buildings, the maximum internal noise level in a residential unit attributable to these tests will be approximately 58 dBA (L_{max}) and is less than the 717 maximum noise levels. This noise level will occur for brief moments during the engine run-ups. In addition, commercial uses immediately north of the C-17 engine run-up area could reach a maximum noise level of 89 dBA (L_{max}). This noise level is less than the maximum noise levels from aircraft departing Runway 12/30, as shown in Table 4 (Station No. 14). However, C-17 engine run-up noise may interfere with speech communication during outdoor activities.

Given the relative infrequency of these C-17 and 717 engine run-up tests (compared to the 41 air carrier flights per day as well as commuter, industrial, charter, and military operations already accounted for in the City's CNEL noise contours for the airport), together with the fact that the associated single event and L_{max} noise levels measured for the C-17 and 717 are similar to the average levels monitored over the last consecutive 12-month period at the most representative station for the project site (Station No. 14), it is reasonable to rely upon the published CNEL contours for the Airport in order to assess the potential noise impact upon the residential land uses of the PacifiCenter project.[276] Therefore, as residential development and associated outdoor recreational areas will not be located within the 65 CNEL contour, no significant impact will occur from the Boeing engine run-up tests.

(f) Substation

The proposed 66kV substation will include four 28 MVA transformers. In addition, as described in the project features an eight-foot high wall will enclose the substation area (approximately 340 feet by 230 feet) if it is located within a residential area.

Operation of the substation will result in the production of long-term noise from transformers. The substation may be located near residential or commercial uses but this conservative analysis assumed the substation will be located near residential uses. The City of Long Beach's noise ordinance specifies a noise level of 55 and 45 dBA at the receiving property boundary as the acceptable limit during the daytime and nighttime hours, respectively. Each transformer will generate a maximum sound level of 61 dBA at approximately six feet. Using accepted additive noise methodology, four transformers will generate a maximum noise level of 67 dBA at approximately six feet. For point sources

[276] *Station No. 14 is the most representative station for the project site and is located near Pixie Avenue and Greenmeadow Road within the City of Lakewood (see Figure 50 on page 501).*

such as transformers, noise decrease by approximately 6 dBA for each doubling of distance for a hard, flat site (no topography). Therefore, with distance attenuation alone and not accounting for the eight-foot wall project feature, the worst-case noise level will be less than 45 dBA at the substation property line, which will comply with the more strict LBMC and LMC nighttime noise standards. Therefore, noise impacts resulting from operation of the substation will be less than significant.

(g) Mechanical Equipment

Project development will include mechanical equipment, which could generate noise levels that are audible at both on- and off-site noise sensitive locations. Such equipment may include, but will not be limited to, air conditioners, fans, blowers, compressors, and pumps that will be used to support the basic functioning of various structures and/or facilities on the property. However, most of this mechanical equipment will be expected to be located within enclosures or behind new buildings or otherwise shielded from the nearby sensitive land uses. In addition to this physical shielding, proper engineering during the detailed design phases, including noise control engineering of the mechanical equipment, should ensure that the noise generated by mechanical equipment operations will meet both LBMC and LMC noise standards. Impacts are expected to be less than significant.

(h) Truck Movements

The noise produced by delivery and trash pick-up trucks at the project site will also be a potential source of annoyance. The noise level within 50 feet of a delivery and trash truck will be approximately 86 dBA during the heaviest periods of activity. These sources of noise currently occur within the project site and vicinity and are typical in an urban environment. As these operations will be intermittent and will occur for short durations, impacts will be less than significant at both on-site receptors and the receptors nearest to the project site.

(i) Parking Facilities

Various sounds, including automobile movement, car alarms, car horns, door slams, and tire squeals, may occur at the parking facilities (surface parking areas and parking structures). The activation of car alarms, sounding of car horns, slamming of car doors, and tire squeals will occur periodically and may occasionally be audible. Noise from these sources, even though intermittent and short-term in nature, may be intermittently audible to nearby sensitive land uses. Automobile movement will result in

the most continuous source of noise and will result in a noise level of approximately 50 dBA at a distance of 25 feet. The resultant noise levels at any nearby sensitive land uses without incorporation of project design features will be over the nighttime residential noise standard of 45 dBA specified in Section 8.80 of the LBMC. As described above, the floors of parking structures will be broom finished to minimize noise from tires, and 42-inch solid spandrels will be used to reduce noise transmission. Parking structures will also include walls or barriers that block the line-of-site from sensitive receptors to parking stalls. Landscaping will be provided along the exterior of all parking structures and parking lots to assist in buffering noise. In addition, project features proposed to reduce interior noise levels at residences from aircraft noise will also reduce noise levels from parking facilities. Noise levels will thus, be reduced with implementation of these project features. A conservative attenuation rate of 6 dBA, only accounting for blocking the line-of-site from sensitive receptors, will result in a noise level of 44 dBA at a distance of 25 feet, which is in compliance with Section 8.80 of the LBMC. Therefore, noise levels associated with operation of the parking facilities will be less than significant.

(2) Vibration

(a) Construction Vibration

Construction operations can generate varying degrees of ground vibration, depending on the construction procedures and the construction equipment used. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receptor building(s). Ground vibrations from construction activities rarely reach the levels that can damage structures. Typically, pile driving generates the highest vibration. The FTA has published standard vibration velocities for construction equipment operations, which are included in Table 9 of the Noise Assessment Technical Report. Based on the FTA data, vibration velocities from typical heavy construction equipment operations range from 0.003 to 0.644 inch/sec at 25 feet from the source of activity. At 75 feet from the source of activity, vibration velocities from typical heavy construction equipment operations range from 0.001 to 0.124 inch/sec. Within the project site, the highest vibration will be generated during pile driving operations, while more consistent, but lower ground vibration will be generated during the clearing, excavation, and grading processes when heavy materials are moved. Both off-site and on-site sensitive land uses will be located at a sufficient distance (greater than 75 feet) from any potential pile driving activity so that vibration from such activities will be below the peak particle velocity threshold of 0.2 inch/sec. Therefore, the project will not generate excessive groundborne vibration or groundborne noise levels and vibration impacts associated with construction will be less than significant.

(b) Operation

Future ground-borne vibration in the project vicinity will continue to be generated by heavy trucks traveling on the local roadways. Potential ground-borne vibration impacts from the airport and Boeing Enclave are not anticipated to affect the new residential uses within the PacifiCenter project site, since all airplanes are equipped with compressed air rubberized tires that act as vibration isolators. In addition, project features to reduce interior noise levels at residences from aircraft noise will help to reduce vibration.

Additional measurements of a Boeing 717 engine run-up test were conducted on July 17, 2003, to determine if low frequency noise levels may cause structure borne vibration and secondary interior noise impacts from possible rattling of doors and windows. These measurements were conducted using the C-weighted scale, which is a better indicator of low-frequency noise as compared to the A-weighted scale. The results indicate that noise levels within the proposed residential uses north of the Boeing Enclave could reach levels of 81 dBC L_{eq} and 89 dBC L_{max}. A complete discussion of the measurements is provided in the Noise Assessment Technical Report, Appendix P.

Information provided by the Federal Interagency Committee on Aviation Noise (FICAN) Expert Panel[277] suggests that the ideal descriptor for measuring low frequency sound level (LFSL) is the sum of the maximum sound levels in the 25-80 Hz one-third octave bands during individual noise events. The documentation provides a low frequency survey response curve conducted at MSP and LAX. The C-weighted measurements best represent the LFSL and were therefore used with the response curve to determine the prevalence of high annoyance due to rattle or vibration. Based on a maximum noise level of 89 dBC, approximately 38 percent of the people will be highly annoyed due to rattle or vibration. Also, the Expert Panel recommended that LFSL doses above 87 dB be identified as incompatible with residential use and not susceptible to remedial treatment. Therefore, as discussed above, a project feature has been incorporated to limit proposed residential uses until the 717 engine run-ups stop within the area identified on Figure 54 on page 526. Areas outside this area will experience a noise level of less than 87 dBC. This, coupled with the project feature discussed above, which will provide insulation for all residential buildings on the project site to reduce interior noise levels below 45 dBA CNEL, the project will not generate excessive groundborne vibration or groundborne noise levels and impacts will be less than significant.

[277] *FICAN on the Findings of the Minneapolis-St. Paul International Airport (MSP) Low-Frequency Noise (LFN) Expert Panel.*

3. CUMULATIVE IMPACTS

a. Cumulative Construction Noise Levels

It is not anticipated that future construction and related-demolition will occur on lots adjacent to the site simultaneously with construction of the proposed project. In the event that such simultaneous construction does occur, however, construction noise levels could be cumulatively significant at sensitive receptors, including single-family residences located along and north of Carson Street. In addition, project construction in certain areas of the site could potentially coincide with later phases of site demolition occurring as part of the ongoing soil and remediation program (Related Project No. 44).[278, 279] Since receptors located immediately adjacent to the project site will occasionally experience project-related noise levels well above existing ambient noise levels and in the absence of City construction noise thresholds, cumulative construction noise levels will also be considered significant.

b. Cumulative Traffic Noise Levels

Compared with the existing conditions, cumulative increases in future predicted CNEL with ambient growth plus project development and all traffic mitigation will be a maximum of 4.6 dBA and will be less than significant for all off-site roadway segments, with the exception of Conant Street east of Lakewood Boulevard (Roadway Segment No. 8), which will increase by 8.3 dBA. This roadway segment is bordered by parking facilities and the Boeing 717 Assembly Facility. While noise levels associated with cumulative traffic at this roadway segment will result in a significant and unavoidable impact, no sensitive receptors will be impacted. An additional analysis was completed for A Street located within the western portion of the site as this street may be located farther to the north and adjacent to the Lakewood Country Club Golf Course (in the vicinity of where Cover Street is currently located). Given the low level of traffic that currently travels on this segment, cumulative mobile noise levels were predicted to increase by 19.6 dBA. However, this roadway segment is bound by the Airport to the south and a golf course to the north, and, therefore no sensitive residential receptors will be impacted. Nonetheless, noise levels associated with cumulative traffic at this roadway segment will result in a significant and unavoidable impact.

[278] *Demolition of structures within the 48-acre Boeing Enclave could occur under either the remediation program or the project; however, the analysis of project impacts provided above conservatively assumed that such activities would occur as part of the project.*

[279] *The project construction noise analysis provided above accounts for the possibility of two separate construction crews working on-site simultaneously.*

c. Cumulative Noise Levels from Facility Operations

The proposed project site will be developed with uses that will generate noise from mechanical equipment, truck movements (e.g., delivery and trash trucks), parking facilities, and a substation. In addition, the ongoing separate remediation activities on the project site (Related Project No. 44) will generate noise from mechanical equipment (i.e., pumps, motors, etc.). However, mechanical equipment from the remediation activities will comply with requirements under Chapter 8.80 of the LBMC, and, therefore will not result in a cumulative operational noise impact to on-site or off-site sensitive receptors. Given the existing urban nature of the project site and vicinity, operation of future related projects together with the PacifiCenter project will not result in cumulative noise impacts from facility operations.

4. MITIGATION MEASURES

The following mitigation measures are recommended to reduce noise and vibration impacts resulting from the proposed project. In addition to these mitigation measures, the project features presented and evaluated above will further reduce impacts associated with noise.

a. Construction

V.I-1 In compliance with Section 8.80.202 of the LBMC, site preparation, grading, and construction within the City of Long Beach shall be limited to the hours of 7 A.M. and 7 P.M., Monday through Friday, 9 A.M. and 6 P.M. on Saturdays, and prohibited on Sundays.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department.

Monitoring Agency: City of Long Beach Planning and Building Department or Public Works Department.

Action Indicating Compliance: Field Inspection

V.I-2 In compliance with Section 8020 of the LMC, site preparation, grading, and construction within the City of Lakewood shall be limited to the hours of 7 a.m. and 7 p.m., Monday through Saturday and 9 a.m. and 7 p.m. on Sundays within 500 feet of a residential zone.

Monitoring Phase: Construction

Enforcement Agency: City Lakewood Community Development Department

Monitoring Agency: City Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-3 All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained muffler exhaust systems.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-4 The project applicant shall provide a construction relations officer to serve as a liaison with surrounding communities and future on-site residents.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Designation of an Officer

V.I-5 Construction activities shall be scheduled so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-6 Engine idling from construction equipment such as dozers and haul trucks shall be limited, to the extent feasible.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-7 Equipment and materials staging shall be located as far from noise-sensitive uses as practical.

Monitoring Phase: Pre-Construction/Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-8 Semi-stationary heavy equipment shall be located as far from noise-sensitive uses as practical.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-9 Electrically powered equipment shall be used instead of equipment driven by internal combustion engines where feasible.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-10 Active construction sites within 400 feet of on-site occupied residential uses shall be acoustically screened with a temporary ten-foot, ½ inch thick plywood fence around the construction zone, to the extent feasible. The plywood fence will have an approximate sound transmission classification level of 18.

Monitoring Phase: Pre-Construction/Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-11 An on-site area shall be designated for delivery of materials and equipment. No construction deliveries shall be permitted outside the hours of 7 a.m. and 10 p.m. on weekdays.

Monitoring Phase: Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-12 Pile shields (i.e., sound blankets) shall be used where pile driving activities occur within 200 feet from the northern property boundary along Carson Street or within 400 feet of on-site residential uses on the project site.

Monitoring Phase: Pre-Construction/Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

V.I-13 Construction routes will be established to avoid residential streets in order to prevent noise and vibration impacts in residential areas. Generally, construction delivery and haul trucks will access the project site from I-405 along Lakewood Boulevard and Cherry Boulevard.

Monitoring Phase: Pre-Construction/Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field Inspection

b. Operation

V.I-14 The residential developer shall provide insulation for all residential buildings on the project site to reduce interior noise levels below 45 dBA CNEL with doors and windows closed and shall provide confirmation of this noise level through an acoustical consultant. In addition, any residential development within the delineated residential area (i.e., hatched area) provided in Figure 54 of this EIR shall require a minimum outside-to-inside noise insulation of 30 dBA and shall appoint an acoustical consultant to confirm that the proposed residential buildings will achieve this design standard before submitting an application for a building permit.[280]

Monitoring Phase: Pre-Construction/Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Issuance of building permits and certificate of occupancy

V.I-15 All persons purchasing, leasing, or renting residential land or property within the PacifiCenter development shall be required to sign an "acknowledgement covenant" which acknowledges the fact that residential properties are near an airport, that there may be low level aircraft overflights, and that there may be noise impacts because of proximity to the Airport and overflights. In addition, the acknowledgment covenant shall acknowledge the avigation easements, which waive the right to take legal action in connection with aircraft noise.

Monitoring Phase: Operation

[280] *As discussed previously, the California Airport Land Use Handbook documents that this level of sound insulation may include the following: 1) air-conditioning/mechanical ventilation such that the units would not have to rely on open windows for ventilation; 2) ½-inch thick glazing, or a dual insulating glazed system comprised of $^{3}/_{8}$-inch thick laminated glass/½-inch air space/¼-inch glass (or acoustical equivalent); 3) doors and windows opening to the exterior with acoustical seals; 4) adding insulation to attics; and/or 5) fitting chimneys and vents with dampers and/or acoustic louvers.*

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Evidence of Acknowledgement

V.I-16 Aircraft related to new aviation-related uses proposed within the project site shall comply with requirements in LBMC Chapter 16.43.030(B) which limits engine run-ups to designated areas at the Airport and between the hours of 7 a.m. and 9 p.m. on weekdays and 9 a.m. and 9 p.m. on weekends and holidays.

Monitoring Phase: Operation

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field inspection

V.I-17 Development of residential uses in close proximity to the Boeing Enclave shall be prohibited until such time that run-up activities permanently cease in the 717 run-up area. The delineation of this area is provided in Figure 54 of this EIR.

Monitoring Phase: Construction/Operation

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department

Action Indicating Compliance: Issuance of building permits

V.I-18 Boeing shall preferentially use the testing positions along the southern side of the Boeing Enclave (Numbers 1-6), as shown in Figure 54 of this EIR

Monitoring Phase: Operation

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Field inspection

V.I-19 The substation shall include an eight-foot high wall surrounding the substation area if it is to be located within a residential area.

Monitoring Phase: Pre-Construction/Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Issuance of building permits and certificate of occupancy

V.I-20 All mechanical equipment shall incorporate noise control measures to ensure that City of LBMC and LMC requirements are satisfied.

Monitoring Phase: Pre-Construction/Construction

Enforcement Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Monitoring Agency: City of Long Beach Planning and Building Department and City of Lakewood Community Development Department

Action Indicating Compliance: Issuance of building permits and certificate of occupancy

5. SIGNIFICANCE AFTER MITIGATION

a. Noise

With implementation of the proposed mitigation measures, future construction operations are expected to generate noise levels at proposed residential areas in close proximity to the construction zone as high as 77 dBA L_{eq} and will substantially reduce the pile driving short-term, maximum noise level of 98 dBA by 10 to 15 dBA. These noise levels will be considerably higher than ambient noise levels. As the worst-case hourly L_{eq} exceeds ambient noise levels by more than the 5 dBA incremental significance threshold, construction of the proposed project will result in a significant and unavoidable impact to proposed on-site sensitive receptors and off-site sensitive receptors (i.e., residential uses located along and north of Carson Street). However, such noise levels will be experienced for short-durations as only portions of the project site will be under construction at any one time. The majority of the time construction noise levels at on-site and off-site sensitive locations will be much lower due to reduced construction activity and the phasing of construction (i.e., construction noise levels at a given location will be reduced as construction activities conclude or move to another more distant location of the site).

The increase in future traffic noise associated with the project and all traffic mitigation will be less than significant for all roadway segments, with the exception of Conant Street east of Lakewood Boulevard, which will exceed the 5 dBA significance threshold. This roadway segment is bordered by parking facilities and the Boeing 717 Assembly Facility. While noise levels associated with project traffic at this roadway segment will result in a significant and unavoidable impact, no sensitive receptors will be impacted.

In addition, if A Street is reconfigured in the western portion of the project site to be adjacent to the Lakewood Country Golf Course, traffic noise on this segment will exceed the 5 dBA significance threshold. This noise increase is due to the fact that the current roadway does not support a large amount of traffic. Nonetheless, this noise increase will result in a significant and unavoidable impact. Residential uses and associated outdoor recreational areas proposed within the PacifiCenter site will be outside of the 65 CNEL contour produced by landing and takeoff activities at the Airport, which are based upon the future maximum expected operating scenario allowed by LBMC Chapter 16.43. Therefore, with incorporation of project features to reduce noise levels at residential uses, noise impacts from Airport operations upon such land uses will be less than significant since these uses will be exposed to lower noise levels than allowed by ALUP, California Code of Regulations Title 21, and FAA Guidelines.

With incorporation of MM V.I-14, the SENEL exposure for the proposed residential uses within PacifiCenter located closest to the Airport from the louder typical MD-80 departure of 90 SENEL, will be reduced to 60 SENEL with an outside-to-inside noise insulation of 30 dBA. As discussed earlier, a "satisfactory conversation" can be obtained with a steady sound level of up to 64 dBA. Therefore, an internal 60 SENEL during a typical MD-80 departure will not be problematic from a speech interference level. During outdoor activities aircraft operations may still briefly interfere with speech communication. In addition, helicopter and general aviation overflights may also be a source of annoyance to proposed sensitive receptors on the project site as a portion of the proposed residential uses are within the 60 CNEL contour and the general community attitude toward a CNEL of 60 dB results in approximately seven percent of the population to be highly annoyed.[281]

Boeing C-17 and 717 engine run-up tests will not be expected to significantly interfere with typical speech communication, watching television or similar activities taking place indoors. However, engine run-up noise may interfere with speech communication during outdoor activities. While production rates could increase in the future, current and projected levels of production (i.e., 16 for C-17's and 12 for 717's) will result in infrequent engine run-up tests.

Given the relative infrequency of these C-17 and 717 engine run-up tests (compared to the 41 air carrier flights per day as well as commuter, industrial, charter, and military operations already accounted for in the City's CNEL noise contours for the airport), together with the fact that the associated single event and L_{max} noise levels measured for the C-17 and 717 are similar to the average levels monitored over the last consecutive 12-month period at the most representative station for the project site (Station No. 14), it is reasonable to rely upon the published CNEL contours for the Airport in order to assess the potential noise impact upon the residential land uses of the PacifiCenter project.[282] Therefore, as residential development and associated outdoor recreational areas will not be located within the 65 CNEL contour, no significant impact will occur from the Boeing engine run-up tests.

With incorporation of the project features associated with parking structures and surface parking areas, noise increases associated with operation of future parking facilities will be less than significant.

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[281] *Source: Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992.*

[282] *Station No. 14 is the most representative station for the project site and is located near Pixie Avenue and Greenmeadow Road within the City of Lakewood (see Figure 50 on page 501).*

b. Vibration

Future ground-borne vibration in the project vicinity will continue to be generated by heavy trucks traveling on the local roadways. Operation of the project with incorporation of project features and mitigation measures will not result in additional sources of vibration which will exceed the City's vibration violation threshold of 0.01 inch/sec at adjacent properties. Specifically, the project feature limiting proposed residential uses within the area identified in Figure 54 on page 526 will reduce potential structural-borne vibration from the engine run-up testing in the Boeing Enclave to a less than significant impact. As such, operational impacts associated with vibration will be less than significant.